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Final Environmental Impact Statement

United States
Department of
Agriculture

Forest Service

**Pacific
Southwest
Region**

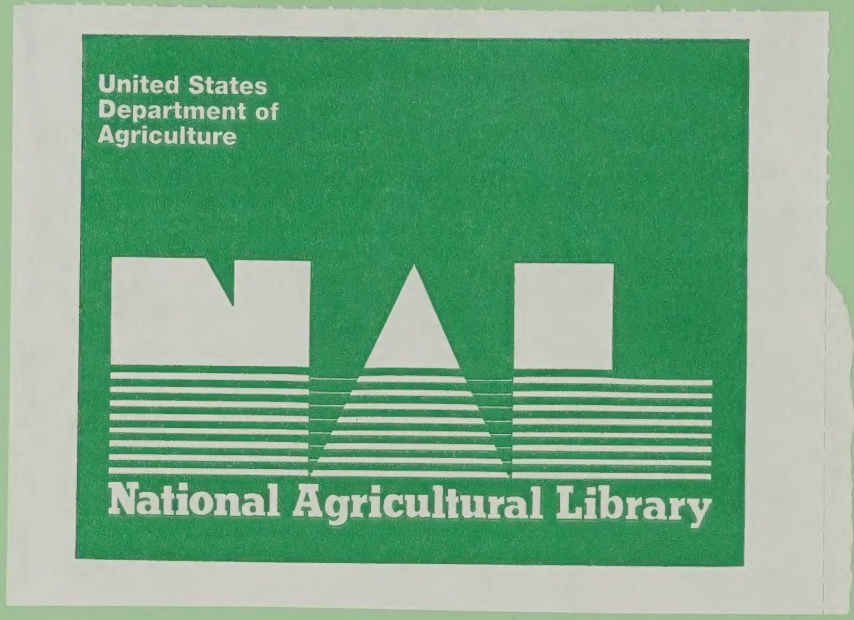
September 2005

CREEKS FOREST HEALTH RECOVERY PROJECT

**Lassen National Forest, Almanor Ranger District
Plumas County, California**

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Creeks Forest Health Recovery Project
Final Environmental Impact Statement
Plumas County, California

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Abstract: The management activities for the Creeks Forest Health Recovery Project were developed to implement and be consistent with the Lassen National Forest Land and Resource Management Plan (LRMP, 1993), as amended by the Herger-Feinstein Quincy Library Group (HFQLG) Forest Recovery Act FEIS (1999), FSEIS (2003) and RODs (1999, 2003) and the Sierra Nevada Forest Plan Amendment (SNFPA) FEIS (2001), FSEIS (2004) and ROD (2004). The Creeks Forest Health Recovery Project Final Environmental Impact Statement describes in detail a proposed action (Alternative 1) and one other action alternative (Alternative 14) for developing a network of defensible fuel profile zones (DFPZs), establish group selection harvest units, and conduct area thinnings within the Creeks Project area. The FEIS describes the no action alternative (Alternative 2), as well as 11 other alternatives that were considered, but eliminated from detailed consideration. The FEIS discloses expected environmental consequences of implementing the action alternatives and the no action alternative. Alternative 14 is the preferred alternative.

SUMMARY

Introduction

The Almanor Ranger District of the Lassen National Forest is proposing the Creeks Forest Health Recovery Project (Creeks Project). The action alternatives are designed to implement and be consistent with the 1993 Lassen National Forest (LNF) Land and Resource Management Plan (LRMP, 1993), as amended by the Herger-Feinstein Quincy Library Group (HFQLG) Forest Recovery Act FEIS (1999), FSEIS (2003) and RODs (1999, 2003) and the Sierra Nevada Forest Plan Amendment (SNFPA) FEIS (2001), FSEIS (2004) and ROD (2004). These documents are herby incorporated by reference.

The project area is located in the Butt Creek Management Area (MA 37) and Soda Ridge Management Area (MA 45) on the Almanor Ranger District of the Lassen National Forest and encompasses approximately 33,000 acres. The project area is located approximately 12 miles southwest of Chester, California, within Plumas County. The project is located in all or portions of: Township (T) 26 North (N), Range 5 East (E), Sections 1-4, 10-15, 23-26, 35, 36; T26N, R6E, Sections 1-12, 17-22, 29-31; T27N, R5E, Sections 13-15, 20-29, 32-36; T27N, R6E, Sections 2, 3, 9-11, 14-21, 26-35; Mount Diablo Meridian. Figure 1-1 shows the project location.

Several basic vegetation communities characterize the forested stands within the Creeks project area. Red fir stands occupy project area topography with the highest elevation and north aspects. Mixed conifer and ponderosa pine occupy the lower, dryer sites. White fir stands occur between the mixed conifer and red fir and white fir is often mixed with red fir. Mixed conifer stands generally have large numbers of shade tolerant fir and incense-cedar in the understory and mid-story; and scattered, large diameter overstory pines. Without management treatments, the species composition of forested stands would continue to shift toward shade tolerant species such as red fir, white fir, and incense cedar.

Purpose and Need

There is a need to respond to the goals and objectives outlined in the 1998 HFQLG Act and Lassen 1993 LRMP as amended. The 1998 HFQLG Act and the Lassen 1993 LRMP as amended, require completion of resource management activities that include a strategic system of DFPZs, area thinnings, and group selections. It is expected that group selection harvesting would contribute to the economic stability of the community. The action alternatives would move the project area toward the desired future condition as described in these plans. The purpose and need for the Creeks Forest Health Recovery Project is as follows:

- The action alternatives are intended to implement the Herger-Feinstein Quincy Library Group Forest Recovery Act (1998 HFQLG Act), which requires the construction of a network of DFPZs, group-selection timber harvest, and individual tree selection (area thinning).
- The action alternatives are intended to implement a DFPZ as part of an extensive fuel treatment network that is effective in reducing the potential size of wildfires, and providing fire suppression personnel safe locations for taking actions in the event of a wildfire.
- The action alternatives are intended to implement individual tree selection (area thinning) to promote forest health and provide an uneven-aged structure to forested stands.

- The action alternatives are intended to implement group selection as directed in the 1998 HFQLG Act to achieve a desired future condition of all-age, multistory, fire resilient forests, while contributing to the local economy through a sustainable output of forest products.
- The action alternatives are intended to implement economically efficient treatments to reduce hazardous fuels and to contribute to community stability.
- The action alternatives are intended to provide the necessary access for the construction of the DFPZs, group-selection timber harvest, and area thinning, and to reduce impacts of the transportation system.

Decision Framework

Based upon the effects of the alternatives described in the Creeks Project Final Environmental Impact Statement (Creeks FEIS), the responsible official will decide whether to: 1) implement the proposed action, 2) meet the purpose and need for action through some other combination of activities, or 3) take no action at this time.

Public Involvement

The proposal was first listed in the Lassen National Forest Schedule of Proposed Actions (SOPA) on February 2004. In the SOPA, the mode of environmental documentation was predicted as an environmental assessment.

A Notice of Availability (NOA) of the Draft Environmental Impact Statement (DEIS) for the Creeks Forest Health Recovery Project was published in the Federal Register on May 27, 2005. The NOA invited comments on the DEIS and stated that comments would be accepted for 45 calendar days following the date of publication in the Federal Register. In addition, a letter was sent to 37 individuals and groups who had responded to scoping, or who had expressed interest in this project, and to agencies and tribal governments of the opportunity to comment on the DEIS. This letter was mailed on May 18, 2005. A legal notice was published in the Lassen County Times on June 7, 2005 also stating the availability of the DEIS and announcing the Opportunity to Comment. Four more requests for the DEIS were received following the publication of the NOA and legal notice.

Comments received on the DEIS, and Forest Service responses to comments, are found in Appendix C. A combination of 34 letters, e-mails, and FAXs were received with comments on the DEIS.

Issues

The Forest Service separated the issues into two groups: significant and non-significant issues. Significant issues are defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues are identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Sec. 1501.7, "...identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)..." One significant issue was identified during the comment period on the DEIS. A list of non-significant issues and reasons regarding their categorization as non-significant may be found in the project file.

Significant Issue

Maintenance of habitat connectivity between areas of suitable habitat for the California spotted owl and American marten

The proposed action would harvest timber in an area described as an "area of concern" for the California spotted owl within the 2001 SNFPA EIS and could exacerbate concerns regarding the owl's distribution and the connectivity of habitat.

The proposed action would degrade habitat connectivity for American marten in the north-south direction of the project area, and therefore is inconsistent with the Lassen LRMP as amended.

The proposed loss and degradation of suitable habitat would have unknown effects to spotted owl site occupancy, survival and reproduction.

The indicators that were used to measure this issue, as well as show comparisons between alternatives, are

- Changes in the amount of suitable owl habitat acres within the area of concern, as mapped under the 2001 SNFPA EIS.
- Change in acres of suitable habitat for California spotted owl within the nest core and breeding territory.
- Change in acres and quality of connectivity through canopy closure and near-ground cover for the American marten.

Alternative 15 was developed to respond to this issue. The objective of Alternative 15 is to maintain existing suitable spotted owl and marten foraging habitat in key areas that are predominately CWHR 4M and 4D. Ten percent of the treatment unit would consist of non-treatment leave islands which would emphasize maintaining small diameter tree canopies. Post treatment canopy closure of trees greater than 6 inch dbh would average 40 to 45 percent canopy closure immediately after treatment. Details can be found in Chapter 2, alternatives considered in detail.

Alternatives Considered

The Forest Service developed 14 alternatives, including the No Action and Proposed Action alternatives, in response to comments raised by the public. Eleven alternatives were eliminated from detailed analysis and are described in Chapter 2 of the Creeks FEIS.

Alternatives Considered in Detail

The Forest Service analyzed the Alternative 1 (Proposed Action), Alternative 2 (No action), and Alternative 14 in detail. Table S-1 summarizes vegetative treatments by alternative. Table S-2 summarizes transportation activities for Alternatives1 and 14.

Alternative 1 – Proposed Action: Create 5,905 acres of DFPZ, 3,285 acres of area thin, and 1,245 acres of group selection using the prescriptions identified in Table S-1. New road construction consists of 1.9 mile of existing unclassified roads being upgraded and brought onto the permanent road system. Transportation system activities are identified in Table S-2.

Alternative 2 – No Action: The proposed action or any modifications to it would not be implemented.

Alternative 14 – Proposed Action: Create 5,905 acres of DFPZ, 3,285 acres of area thin, and 1,186 acres of group selection using the prescriptions identified in Table S-1. All DFPZ fuel treatments for Alternative 14 are similar to Alternative 1, except for the change in the number of acres treated through Prescriptions B (and some small areas of Prescription A), and the subsequent treatment of these same acres through Prescription E.

Prescription E would be applied to 612 acres. Small "leave islands" up to 1/4 acre in size would be left untreated over approximately 10% of the treatment units to provide a greater component of small sized trees and stand heterogeneity. All area thinning fuel treatments for Alternative 14 are similar to Alternative 1 except that 53 acres of group selections would not be implemented within this treatment type. The dropped group selection units would be retained as non-treatment "leave islands." Transportation system activities are identified in Table S-2.

Table S-1. Summary of Vegetative Treatments by Alternative.

Prescription	Treatment	Alternative 1	Alternative 2	Alternative 14
A	DFPZ; surface and ladder fuels, slopes < 35%	1,420	0	1,360
A	DFPZ; surface and ladder fuels, slopes 35%+	35	0	35
B	DFPZ; surface, ladder, and canopy fuels, slopes <35%	3,775	0	3,223
B	DFPZ; surface, ladder, and canopy fuels, slopes 35%+	280	0	280
C	DFPZ; surface, ladder, and canopy fuels in CWHR 5M, 5D, and 6 class stands, slopes <35%	360	0	360
C	DFPZ; surface, ladder, and canopy fuels in CWHR 5M, 5D, and 6 class stands, slopes 35%+	35	0	35
E	DFPZ; surface and ladder fuels, 10% leave islands, slopes < 35%	0	0	612
E	DFPZ; surface and ladder fuels, slopes 35%+	0	0	0
	Total DFPZ acres	5,905	0	5,905
F	Area Thin; surface and ladder fuels, slopes <35%	515	0	515
F	Area Thin; surface and ladder fuels, slopes 35%+	25	0	25
G	Area Thin; surface, ladder, and canopy fuels, slopes <35%	735	0	735
G	Area Thin; surface, ladder, and canopy fuels, slopes 35%+	30	0	30
H	Area Thin; surface, ladder, and canopy fuels in CWHR 4M, 4D, 5M, 5D, and 6 class stands, slopes <35%	1,875	0	1,875
H	Area Thin; surface, ladder, and canopy fuels in CWHR 4M, 4D, 5M, 5D, and 6 class stands, slopes 35%+	105	0	105
	Total Area Thin Acres	3,285	0	3,285
	Group Selection; slopes <35%	1,040	0	983
	Group Selection; slopes 35%+	205	0	203
	Total Group Selection Acres	1,245	0	1,186
	Total Acres	10,435	0	10,376

Note: Prescription D is a Almanor Ranger District prescriptions not used in this project. Prescription E is used in Alternative 14.
Source: Almanor Ranger District GIS

Table S-2. Summary of transportation system activities (miles) for Alternative 1 and Alternative 14

Activity	Permanent System Roads	Unclassified Roads
Construction	-	1.9 miles
Temporary Road Const.	-	5.0 miles existing 3.7 miles new
Decommission	1.2 miles	8.7 existing & new temp
Water Source Activities	2 locations	-

Source: Almanor Ranger District GIS

Environmental Effects on Key Resources

Tables S-3 and S-4 summarizes the key resource environmental effects of Alternative 1 (Proposed Action), Alternative 2 (No Action), and Alternative 14. Detailed discussions of environmental affects for all resources analyzed can be found in Chapter 3 of the FEIS.

Table S-3. Summary of Effects to Key Resources

	Alternative 1 – Proposed Action	Alternative 2 – No Action	Alternative 14
Silviculture Resources			
Changes in CWHR Class	Refer to Table S-4 below	Refer to Table S-4 below	Refer to Table S-4 below
Fire / Fuels			
Condition Class	Moves treatment units toward Condition Class 1.	Condition Classes 2 and 3.	Moves treatment units toward Condition Class 1.
Fire Hazard	Reduces hazardous wildland fire behavior from fires both originating within treatments and from outside point sources.	Moderate to high.	Reduces hazardous wildland fire behavior from fires both originating within treatments and from outside point sources.
Fire Risk	High	High	High
Wildlife			
Decadence	General reduction in the number of snags within the areas treated, however, project would not substantially affect current snag levels within the treated areas and snag numbers would continue to increase within the project area due to natural recruitment.	No change from current conditions. Overall snag numbers are likely to increase over time due to natural recruitment.	Same Alternative 1, except minor increase in areas that would retain snags and large down wood.
Determinations – TES terrestrial wildlife species			
Federally listed species or their designated critical habitat	Preliminary determinations from DEIS - No affect - Northern Bald Eagle, Northern Spotted Owl, and the Valley Elderberry Longhorn Beetle.	No affect to these species.	No affect - Northern Bald Eagle, Northern Spotted Owl, and the Valley Elderberry Longhorn Beetle.
Determinations - Forest Service sensitive species			
Forest Service sensitive species	Preliminary determinations from DEIS - No affect - Great Grey Owl, Greater Sandhill Crane, Swainson's Hawk, Greater Sage Grouse, California Wolverine, Sierra Nevada Red Fox, Pacific Fisher, Townsend's Big-Eared Bat, Western Red Bat, and Northwestern Pond Turtle. May affect individuals, but is not likely to cause a trend towards federal - California Spotted Owl, Northern	No affect to these species.	No affect - Great Grey Owl, Greater Sandhill Crane, Swainson's Hawk, Greater Sage Grouse, California Wolverine, Sierra Nevada Red Fox, Pacific Fisher, Townsend's Big-Eared Bat, Western Red Bat, and Northwestern Pond Turtle. May affect individuals, but is not likely to cause a trend towards federal - California

	Alternative 1 – Proposed Action	Alternative 2 – No Action	Alternative 14
	Goshawk, Willow Flycatcher, American Marten, and Pallid Bat.		Spotted Owl, Northern Goshawk, Willow Flycatcher, American Marten, and Pallid Bat.
Management Indicator Species			
Mule deer	Project would have no measurable effect on population trends.	Alternative would further reduce deer habitat within the project area and cumulatively within the Forest.	Same Alternative 1.
Black bear	Project risk to the species is considered very low and population trends would not be affected.	Alternative would have no measurable affects on this species, as no changes to habitat attributes would occur.	Same Alternative 1.
Hairy woodpecker	Population trends would remain unaffected by the project.	Alternative increases number of snags and increases ratio of hard to soft snags, which relates to forage habitat.	Same Alternative 1.
Pileated Woodpecker	Project would have little impact on the amount of moderate and high quality habitat; no effect to species or population trends.	Alternative would maintain current status and distribution of habitat and over time habitat would improve due to increases in larger snags and tree sizes.	Same Alternative 1, except with the addition of Prescription E, may see improved localized use of areas due to retention of pockets with higher densities.
Peregrine Falcon	Project would not affect the nesting habitat. Limited operating periods would limit disturbance during nesting. Project may have limited impacts to prey species.	Alternative would continue the trend of declining forage habitat due to increased stand densities. Alternative would have no effect on the existing nesting habitat.	Same Alternative 1.
Migratory Landbirds	Project is not likely to have a measurable long-term affect on migratory bird species, however, it is likely local populations would initially decline within the treatment area.	Alternative would continue the trend of denser canopied stands with a decline in understory vegetation that is preferred by most species.	Same Alternative 1, except for limited localized improvement for species that prefer denser stands for nesting.
Watershed / Fishery Resources			
Watershed and Aquatic Resources			
Sediment	Forest harvest and thinning activities are not expected to measurably increase delivery of sediment to stream channels. A long-term decrease in road surface sediment production is expected as a result of the proposed action. In the short term, the time during which roads are used for haul, it is expected sediment reductions from road surface and road surface treatments at stream crossings would be balanced by increases due to road maintenance.	Sediment production from project area watersheds would remain in its present condition, or lacking adequate road maintenance, may slightly increase.	Slightly lower risk of erosion and sediment delivery from harvest activities than Alternative 1, but difference is small.

	Alternative 1 – Proposed Action	Alternative 2 – No Action	Alternative 14
Determinations – Forest Service Sensitive Species			
Forest Service sensitive species	Preliminary determinations from DEIS - There are no known populations of either Cascades frog or MYLF in the project area. The project may affect individuals but is not likely to result in a trend toward Federal listing or loss of viability for the Cascades frog or the mountain yellow-legged frog.	No affect to Cascades frog or the mountain yellow-legged frog. As no action would preclude any activities, there would be no short term direct or indirect effects to sensitive aquatic species, or their habitat.	There are no known populations of either Cascades frog or MYLF in the project area. The project may affect individuals but is not likely to result in a trend toward Federal listing or loss of viability for the Cascades frog or the mountain yellow-legged frog.
Management Indicator Species			
Rainbow Trout	There is a low risk that the alternative would contribute toward adverse effects to rainbow trout.	As no action would preclude any activities, there would be no short term direct or indirect effects to management indicator aquatic species, or their habitat. In the long term, sediment conditions would remain unchanged, rather than be improved, so habitat for MIS rainbow trout would remain unchanged.	Same Alternative 1
Cumulative Watershed Effects			
Sub Watershed and Threshold of Concern (TOC) in Percent ERA			
Fanani	4	4	4
Grizzly Creek	14	10	14
Humbug Valley	6	4	6
Lemm Hollows	13	9	13
Marian Creek	3	3	3
Ruffa	5	3	5
Shanghai Creek	5	2	5
Soda Creek	5	4	4
Soldier Creek	3	3	3
Upper Yellow Creek	12	9	12

Table S-4. Changes in Project Area CWHR classes between Alternative 1, Alternative 2 and Alternative 14.

Alternative 2, No Action

Forest Cover Type	CWHR Class - Acres in Project Area, Pre Treatment																
	Seed-ling	Sapling (1" - 5.9" dbh)				Pole (6" - 10.9" dbh)				Small (11" - 23.9" dbh)				Medium/Large (> 24" dbh)			
	1	2S	2P	2M	2D	3S	3P	3M	3D	4S	4P	4M	4D	5S	5P	5M	5D
Aspen	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0
Lodgepole pine	0	0	0	0	0	0	29	37	0	0	0	0	0	0	0	0	0
Mixed conifer	59	131	0	8	0	340	492	303	19	181	1,854	6,437	2,728	9	203	1,249	60
Ponderosa pine	0	29	43	0	4	0	159	39	102	11	8	0	0	0	0	0	0
Red fir	0	218	112	0	0	106	171	189	281	186	429	1,758	1,228	29	77	25	92
White fir	0	373	17	18	0	1,158	599	169	116	358	2,282	2,844	1,067	22	159	185	20
Total acres	59	751	172	26	4	1,604	1,450	737	518	736	4,591	11,039	5,023	60	439	1,459	172

Change between Alternative 2, No Action and Alternative 1, Proposed Action

Forest Cover Type	CWHR Class - Acres in Project Area, Post Treatment																
	Seedling	Sapling (1" - 5.9" dbh)				Pole (6" - 10.9" dbh)				Small (11" - 23.9" dbh)				Medium/Large (> 24" dbh)			
	1	2S	2P	2M	2D	3S	3P	3M	3D	4S	4P	4M	4D	5S	5P	5M	5D
Aspen	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0
Lodgepole pine	0	0	0	0	0	0	29	37	0	0	0	0	0	0	0	0	0
Mixed conifer	867	131	0	8	0	340	497	236	19	178	2,867	5,138	2,098	9	198	1,428	59
Ponderosa pine	1	29	32	0	0	0	173	21	54	11	46	28	0	0	0	0	0
Red fir	110	218	112	0	0	106	171	122	206	186	838	1,509	1,051	29	77	74	92
White fir	326	368	17	8	0	1,156	598	147	110	347	2,572	2,330	976	22	159	231	20
Totals	1,304	746	161	16	0	1,602	1,468	563	389	722	6,341	9,005	4,125	60	434	1,733	171
Acre Changes	+1,245	-5	-11	-10	-4	-2	+18	-174	-129	-14	+1,750	-2,034	-898	NC	-5	+274	-1

Change between Alternative 2, No Action and Alternative 14

Forest Cover Type	CWHR Class - Acres in Project Area, Post Treatment																
	Seedling	Sapling (1" - 5.9" dbh)				Pole (6" - 10.9" dbh)				Small (11" - 23.9" dbh)				Medium/Large (> 24" dbh)			
	1	2S	2P	2M	2D	3S	3P	3M	3D	4S	4P	4M	4D	5S	5P	5M	5D
Aspen	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0
Lodgepole pine	0	0	0	0	0	0	29	37	0	0	0	0	0	0	0	0	0
Mixed conifer	834	131	0	8	0	340	497	245	19	178	2,707	5,322	2,098	9	198	1,429	59
Ponderosa pine	1	29	32	0	0	0	173	21	54	11	46	28	0	0	0	0	0
Red fir	107	218	112	0	0	106	171	124	206	186	807	1,541	1,052	29	77	74	92
White fir	303	368	17	8	0	1,156	599	147	110	347	2,572	2,346	978	22	159	233	20
Totals	1,245	746	161	16	0	1,602	1,469	574	389	722	6,150	9,237	4,128	60	434	1,735	171
Acre Changes	+1,186	-5	-11	-10	-4	-2	+19	-163	-129	-14	+1,559	-1,802	-895	NC	-5	+277	-1

Source: Almanor District GIS (Vestra_veg); S1 sparse cover, 10-24 percent canopy cover; P2 open cover, 25-39 percent canopy cover; M3 moderate cover, 40-59 percent canopy cover ;D4 dense cover, 60-100 percent canopy cover.

Table of Contents

Table of Contents 1
Chapter 1. Purpose and Need 1
Document Structure 1
Background 1
Purpose and Need for Action 2
Proposed Action 8
Decision Framework 8
Public Involvement 8
Issues 9
Significant Issue 9
Maintenance of habitat connectivity between areas of suitable habitat for the California spotted owl and American marten 9
Laws, Regulations, and Policies 10
Civil Rights Impact Analysis (USDA Regulation 4300-4) 10
Clean Water Act (Public Law 92-500) 10
Clean Air Act (Public Law 84-159) 10
Environmental Justice (Executive Order 1289) 11
Endangered Species Act OF 1973 (Public Law 93-205) 11
Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 136 as amended) 12
Herger-Feinstein Quincy Library Group Forest Recovery Act of 1998 (Title IV, Section 401) 12
Migratory Bird Treaty Act of 1918 as amended (16 USC 703-712) 12
National Forest Management Act OF 1976 (NFMA; Public Law 94-588) 12
National Historic Preservation Act (Public Law 89-665) 13
Wild and Scenic Rivers Act (Public Law 90-542, as amended) 13
Permits and Coordination 13
Chapter 2: Alternatives 14
Introduction 14
Alternatives Considered in Detail 14
Alternative 1 – Proposed Action 14
Defensible Fuel Profile Zones 14
Area Thinning 17
Groups Selection Harvests 19
Alternative 2 - No Action 23
Alternative 14 23
Defensible Fuel Profile Zones 23
Area Thinning 24
Groups Selection Harvests 24
Elements Common to Both Action Alternatives 27
Road Management 27
Integrated Design Features 29
Riparian Area Management 29
Management within RHCAs 29
Alternatives Considered but Eliminated from Detailed Study 35
Alternative 3 – Implement the project using 2001 SNFPA ROD direction 35
Alternative 4 – Retain mid-large trees and canopy closure. Treat only surface and ladder fuels. 35

Alternative 5 – Retain all trees greater than 12 inches diameter in RHCAs. 36
Alternative 6 – No group selection units within ¼ mile of the Pacific Crest Trail (PCT) or the Peacock Point Trail. Implement a 250-foot no treatment zone along the Pacific Crest Trail. 36
Alternative 7 – No activities in marten habitat, no removal of trees > 30 inches for operability, and limit the reduction of canopy closure and basal area. 36
Alternative 8 – Decommission more roads. 37
Alternative 9 – Use group selection treatments instead of DFPZ treatments in roadless areas and in furbearer management areas. 37
Alternative 10 – Limit the reduction of canopy closure and basal area in Goshawk nesting and foraging areas. 37
Alternative 11 – Treat activity fuels using other methods such as chipping and mulching. 38
Alternative 12 - Introduce native forbs and grasses to help prevent the occurrence and spread of noxious weeds. 38
Alternative 13 – Increasing fire resilient pine. 38
Comparison of Alternatives 39
Meeting Purpose and Need 39
Addressing the Significant Issue 40
Environmental Effects on Key Resources 40
Chapter 3. Affected Environment and Environmental Consequences 44
Introduction 44
Silvicultural Resources 44
Affected Environment 44
Project Area Covertypes 44
Stand Composition 44
Stand Structure and Density 45
Forest Health 48
Environmental Effects 49
Alternative 1 – Proposed Action 49
Alternative 2 - No Action 74
Alternative 14 – 76
Fire / Fuels / Air Quality 86
Affected Environment 86
Historic Fires 86
Stand Structure/Composition 87
Condition Class 88
Fire Weather 93
Fire Hazard Assessment 94
Existing Fuels Conditions 95
Desired Fuels Conditions/Fire Behavior 96
Environmental Effects 98
Alternative 1 - Proposed Action 98
Alternative 2 – No Action 113
Alternative 14 116
Wildlife 120
Forest Direction for Federally Listed and Sensitive Species 120
Forest Direction for Management Indicator Species 121
Key Habitat Attributes 122
General Vegetation Changes 123

Affected Environment....123
Environmental Effects....125
Selected Vegetative Decadence – Snags and Down Wood....130
Affected Environment....130
Environmental Effects....132
Threatened, Endangered, and Sensitive (TES) Terrestrial Wildlife Species....134
California Spotted Owl....134
Northern Goshawk....162
Willow Flycatcher....169
Pacific Fisher / American Marten....171
Pallid Bat....189
Determinations for Terrestrial TES Species Considered in this Document....191
Management Indicator Species (MIS)....191
Mule Deer....193
Black Bear....198
Hairy Woodpecker....201
Pileated Woodpecker....204
Peregrine Falcon....208
Migratory Landbirds....210
Watershed / Fisheries / Soils....214
Field Surveys/Resource Contacts....214
Best Management Practices....214
Beneficial Uses and Impaired Waterbodies....215
Soils....215
Affected Environment....215
Watershed and Aquatic Resources....224
Affected Environment....224
Sediment....224
Temperature, Shade and Large Woody Debris....228
Floodplains and Wetlands....228
Water Yield....230
Aquatic Species (including sensitive and management indicator species)....230
Botany....247
Consultation To Date....249
Sensitive Plants....249
Affected Environment....249
Environmental Effects....253
Determinations for Sensitive Plant Species....260
Special Interest Plants....260
Affected Environment....260
Environmental Effects....261
Management Indicator Species - Botany....266
Affected Environment....266
Existing Conditions....266
Environmental Consequences....267
Alternative 1 - Proposed Action....267
Alternative 2 - No Action....269
Alternative 14....270

Economics 271
Affected Environment 271
Analysis Methods 271
Environmental Effects 271
Alternative 1 - Proposed Action 271
Alternative 2 – No Action 273
Alternative 14 274
Range 274
Affected Environment 274
Range Social and Economic Values 275
Capable Range 276
Vegetation Monitoring and Use 276
Key Areas 276
Annual Monitoring 277
Long Term Trend Monitoring 277
Desired Condition 279
Current Condition 279
Environmental Effects 282
Alternative 1 - Proposed Action 282
Alternative 2 - No Action 287
Alternative 14 287
Recreation / Visual Resources 288
Affected Environment 288
Recreation Opportunity Spectrum 288
Visual Quality Objectives 291
Environmental Effects 291
Alternatives 1 and 15 291
Alternative 2 – No Action 295
Cumulative Effects to Recreation 295
Disclosures 296
Silvicultural Resources 296
Fire / Fuels / Air Quality 296
Wildlife 297
Watershed / Fisheries / Soils 301
Botany 302
Economics 302
Heritage Resources 302
Range 303
Recreation / Visual Resources 303
Other Required Disclosures 304
Chapter 4. Consultation and Coordination 305
Preparers and Contributors 305
Distribution of the Environmental Impact Statement 310
Chapter 5. Cited References 312
Index 326

Chapter 1. Purpose and Need

Document Structure

The Forest Service has prepared this Final Environmental Impact Statement in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Final Environmental Impact Statement discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into five chapters:

- Chapter 1. Purpose and Need for Action: The chapter includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- Chapter 2. Alternatives, including the Proposed Action: This chapter provides a more detailed description of the alternatives the agency considered for this project, including integrated design features. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- Chapter 3. Affected Environment and Environmental Consequences: This chapter describes the environmental effects of implementing the proposed action and no action alternatives. This analysis is organized by resource area.
- Chapter 4. Consultation and Coordination: This chapter provides a list of preparers and agencies consulted during the development of the Final Environmental Impact Statement.
- Chapter 5. Cited References: This chapter contains a listing of all the references cited in Chapters 1, 2, and 3.
- Appendices: The appendices provide additional information as needed to support the analyses presented in the Final Environmental Impact Statement.
- Index: The index provides page numbers by document topic.

Background

The Almanor Ranger District of the Lassen National Forest is proposing the Creeks Forest Health Recovery Project (hereafter called Creeks Project). The Proposed Action is designed to implement and be consistent with the 1993 Lassen National Forest (LNF) Land and Resource Management Plan (LRMP) (USDA FS, 1993a), as amended by the Herger-Feinstein Quincy Library Group (HFQLG) Forest Recovery Act FEIS (1999), FSEIS (2003) and RODs (1999, 2003) (USDA FS, 1999a) and the Sierra Nevada Forest Plan Amendment (SNFPA) FEIS (2001), FSEIS (2004) and ROD (2004) (USDA FS, 2001a and USDA FS, 2004a).

The project area is located in the Butt Creek Management Area (MA 37) and Soda Ridge Management Area (MA 45) on the Almanor Ranger District of the Lassen National Forest and encompasses approximately 32,570 acres. The project area is located approximately 12 miles southwest of Chester, California, within Plumas County. The project is located in all or portions of: Township (T) 26 North (N), Range 5 East (E), Sections 1-4, 10-15, 23-26, 35, 36; T26N, R6E, Sections 1-12, 17-22, 29-31; T27N, R5E, Sections 13-15, 20-29, 32-36; T27N, R6E, Sections 2, 3, 9-11, 14-21, 26-35; Mount Diablo Meridian. Figure 1-1 shows the project location.

Several basic vegetation types characterize the forested stands within the Creeks project area. Red fir stands occupy project area topography with the highest elevation and north aspects. Mixed conifer and ponderosa pine occupy the lower, dryer sites. White fir stands occur between the mixed conifer and red fir types, and white fir is often mixed with *both pine* and red fir. Mixed conifer stands generally have large numbers of shade tolerant fir and incense-cedar in the understory and mid-story; and scattered, large diameter overstory pines. The species composition of forested stands would continue to shift toward shade tolerant species such as red fir, white fir, and incense-cedar without management treatments.

In February 2005, the Lassen National Forest Supervisor (Responsible Official) made the decision to analyze this project under an Environmental Impact Statement. Since only minor changes were made to the proposed action, and because this project had been previously scoped with the public, the new scoping period was set for 15 days. A Notice of Intent (NOI) was published in the Federal Register on February 28, 2005. The NOI asked for public comment on the proposal by March 15, 2005. In addition, a letter was sent to the 33 individuals and groups who had responded to the previous scoping effort, or who had expressed interest since that effort and to agencies and tribal governments of the opportunity to comment on the new Creeks Proposed Action. This letter was mailed on February 24, 2005.

Purpose and Need for Action

There is a need to respond to the goals and objectives outlined in the 1998 HFQLG Act and the 1993 Lassen LRMP as amended. The 1998 HFQLG Act and the 1993 Lassen LRMP, as amended, require completion of resource management activities that include a strategic system of defensible fuel profile zones (DFPZs), area thinnings, and group selections. It is expected that group selection harvesting would contribute to the economic stability of the community. The Proposed Action would move the project area toward the desired future condition as described in these plans. The purpose and need for the Creeks Forest Health Recovery Project is as follows:

1. The proposed action is intended to implement the Herger-Feinstein Quincy Library Group Forest Recovery Act (1998 HFQLG Act) (USDA FS, 1999a), which requires the construction of a network of DFPZs, group-selection timber harvest, and individual tree selection (area thinning).

The 1998 HFQLG Act directed that, as part of a pilot project involving three national forests, the Lassen National Forest would test and demonstrate the effectiveness of certain resource management activities designed to meet ecologic, social, economic, and fuel-reduction objectives to the extent consistent with applicable federal law. Accomplishing the purpose of the 1998 HFQLG Act requires the construction of a network of DFPZs on 40,000-60,000 acres and group selection timber harvest on 8,700 acres each year in the pilot project area. In his decision for the 2004 SNFPA, the Regional Forester directed that the Plumas, Lassen, and Tahoe National Forests are to fully implement the HFQLG Pilot Project to *"...allow knowledge to be gained from moving forward with the pilot project, as it was originally envisioned." (USDA FS, 2004a [page 5]).*

The Creeks Forest Health Recovery Project is intended to be the next increment of implementation of this Congressional mandate and Lassen National Forest plan direction.

2. The proposed action is intended to implement a DFPZ as part of an extensive fuel treatment network that is effective in reducing the potential size of wildfires, and providing fire suppression personnel safe locations for taking actions in the event of a wildfire.

The DFPZs proposed for the Creeks project area are designed and located to be part of a larger strategic system of DFPZs that provides fire suppression personnel relatively safe locations from which to take action against wildfires. The proposed DFPZ is a link in the HFQLG DFPZ network. Sections of DFPZs have been started within the project area, but the network is currently incomplete. The proposed DFPZs would connect to future DFPZs to the west of the Creeks project area, and to fuels reduction treatments on adjacent private property to the east of this area.

Wildfire suppression efforts can be assisted by the availability of DFPZs located along strategic landscape features such as roads and ridgelines. DFPZs, such as the ones being proposed in this action, are needed to reduce fire intensity in the precise locations where firefighters should be deployed for safe and effective suppression efforts. The DFPZs would inhibit the spread of fires that may approach from the dominant upwind south and west directions.

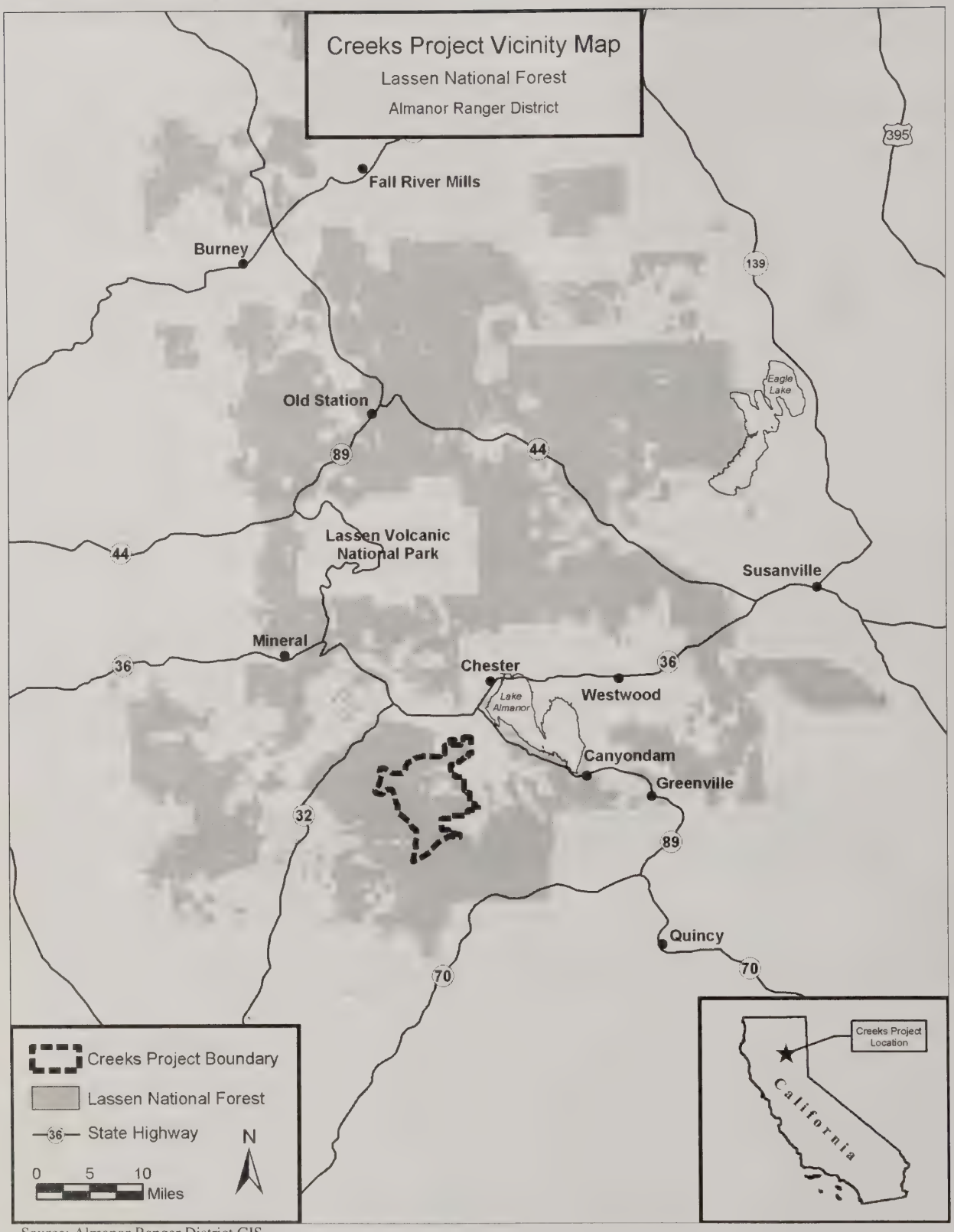
The amended Forest Plan directs that management of land and resources be designed to maintain desired conditions or to move existing conditions toward desired conditions. An assessment of the Creeks project area showed that existing fuels do not meet desired conditions. Treatments within the DFPZs are designed to move the treated stands toward desired conditions by reducing surface fuels, raising crown base height by reducing ladders fuels, and reducing crown fuels.

Several basic vegetation types characterize the forested stands within the Creeks project area. Existing conditions within the project area include moderate to high fuel loads with surface fuels ranging between 5-26 tons per acre. Approximately 25 percent of the treatment area is considered to contain moderate surface fuel loadings, and approximately 75 percent of the treatment area contains high surface fuel loadings. Existing surface fuel conditions within the vegetation types vary and are displayed in Table 1-1.

Table 1-1. Estimated fuel loading (tons/acre) by vegetation type.

Vegetation Type	Surface Fuel Loading (Tons/Acre)	Mean Surface Fuel Loading (Tons/Acre)
Ponderosa Pine	3 - 34	9.0
Red Fir	15 - 42	22.8
Mixed Conifer	15 - 42	30.0
Mixed Conifer/White Fir	15 - 42	27.4

Figure 1-1. Creeks Project Vicinity



Source: Almanor Ranger District GIS

In an effective DFPZ, a low amount of surface fuels would be present. These fuels need to be treated to bring surface fuels loadings within the desired range of 3 to 5 tons per acre for course down woody material in the 0-12 inch diameter range. No more than 10-15 tons per acre of course down woody material in excess of 12 inches in diameter should exist in order to meet DFPZ standards. Under current stand conditions and 90th percentile weather, a wildfire could result in crown fire activity in many stands within the project area. Predicted flame lengths are in excess of 4.0 feet, which exceeds NFDRS (National Fire Danger Rating System) for direct fire attack using ground forces. Ladder fuels within most of the stands in the Creeks project area are relatively dense and live crown base heights range from 7 to 12 feet. These existing ladder fuels and low crown base heights increase the risk that fire could be transferred into the crown, thereby increasing the probability of sustained crown fire and unsafe conditions for fire suppression efforts. Given the current surface fuel condition, combined with existing live crown base height, a wildfire in the 90th percentile fire weather condition could transfer fire from the surface to the tree canopy. The current fuel conditions do not provide for safe fire suppression efforts. Treating surface, ladder and crown fuels as described in the proposed action is needed in order to reduce the rate of spread of fire, reduce flame lengths, reduce the probability of crown fire, and to provide for a safer and more effective fire suppression environment.

The forested stands within the Creeks project area are predominately in Condition Classes 2 and 3 (A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment – 10-Year Comprehensive Strategy (USDA FS and USDI, 2001). These conditions are the result of altered forest structures that have occurred because of many years of fire suppression, and from past forest management practices. These conditions have led to overall densification of the stands with encroachment and establishment of shade tolerant tree species (white fir), particularly in the understory and mid-story. Approximately 60% of the stands proposed for treatment have moderate to dense canopy cover ranging from 40-100%. Stocking density in these stands is high with average basal area generally between 240-300 square feet per acre or more. Approximately 65% of the stands are above 60% of their maximum stand density index (SDI) and approximately a third of them are above 70% of their maximum SDI. See the discussion of Silvicultural Resources in Chapter 3 for the definition and use of SDI. Stands that are less dense (less than 40% average canopy cover and an SDI of 50% or less of maximum SDI) have undesirably dense surface and ladder fuels, as well as scattered undesirable dense pockets of trees that aren't reflected in measures of average canopy cover or stand density. Desirable stand densities for the DFPZ would range from 35 to 50 percent of maximum SDI, with basal area ranging from 150 to 250 square feet per acre. Fuel reduction treatments, such as thinning from below by removing most of the saplings and poles and some of the small and medium sized trees, is needed in order to develop the desired stand conditions within the DFPZ and in order to move stands from Condition Classes 2 and 3, to the desired Condition Class of 1. Fuel reduction treatments would create conditions conducive to reintroducing periodic low-intensity prescribed fire to maintain the desired Condition Class. Thinning would also provide forest products that contribute to community stability through employment and value added processing.

Fuel reduction treatments within Riparian Habitat Conservation Areas (RHCAs) are needed meet Riparian Management Objectives (RMOs). RMOs for the project area include: 1) Maintain or restore riparian vegetation to provide an amount and distribution of large woody debris characteristic of natural aquatic and riparian ecosystems. Within much of the RHCAs, the existing conifer stands are both overstocked and are

relatively even aged. There is a need to thin the conifer stands to allow the remaining trees to reach larger sizes sooner, increasing the potential for delivery of larger trees to aquatic habitats in the long term, 2) Maintain or restore the diversity and productivity of native and desired non-native plant communities in the riparian zone. There is a need to apply selective fuels treatment to allow more light to penetrate the forest floor and improve conditions for riparian shrub and tree species, 3) Maintain or restore habitat to support populations of well-distributed native and desired non-native plant, vertebrate, and invertebrate populations that contribute to the viability of riparian plant communities. There is a need to increase the diversity and overall health of the riparian community and to reduce the effects of wildfires. Treatments within riparian zones would move the riparian community toward a more historic composition, providing the opportunity for native flora and fauna to trend towards a more sustainable condition.

The proposed action is intended to achieve the desired conditions on the areas treated through reductions in surface fuels, ladder fuels, and crown fuels.

3. The proposed action is intended to implement individual tree selection (area thinning) to promote forest health and provide an uneven-aged structure to forested stands.

As discussed under the need to implement DFPZs (#2 above), most stands within the project area have been altered from historic structures due to many years of fire suppression, and from past forest management practices. These conditions have led to overly dense stands with encroachment and establishment of shade tolerant tree species. Currently most stands have stand density indices from 50% to over 80% of maximum SDI, with basal areas generally from 240 to over 300 square feet per acre. Over-stocked stands are at risk for insect and disease outbreaks, and are susceptible to stand replacement due to wildfire. Stands that are less dense (basal areas less than 200 square feet per acre and SDIs of 50% or less of maximum SDI) have undesirably dense surface and ladder fuels, as well as scattered undesirable dense pockets of trees that are not reflected in measures of average basal area or stand density. Desired densities for these stands are between 35 and 50 percent of maximum SDI, with basal areas generally ranging from 150 to 250 square feet per acre. The proposed area thinning treatments are needed in order to promote healthy forested stands by improving the growth and vigor of residual trees, and to reduce the risk of stand replacement due to wildfire.

Within the Creeks project area, area thinning is needed to reinforce the DFPZs. Area thinning would help build a strategic network of reduced fuel concentrations where fire severity and rates of spread are appreciably reduced. Along with DFPZs, area thinning would provide increased protection to important wildlife habitat areas such as California spotted owl and northern goshawk protected activity centers (PACs).

Area thinning is also needed in the project area in order to promote healthy forested stands to assist in the maintenance of late-successional species diversity. The Creeks project area provides habitat for spotted owls, which utilize large expanses of closed canopy forest. Providing a higher canopy closure-thinning regime would maintain suitable habitat at a higher level while still reducing the risk of stand-replacing wildfire through the reduction of surface, ladder, and canopy fuels. The proposed action would maintain elevated canopy closures and multiple canopy layers where they currently exist.

4. The proposed action is intended to implement group selection as directed in the 1998 HFQLG Act to achieve an a desired future condition of an all-age, multi-story, fire resilient forest, while contributing to the local economy through a sustainable output of forest products.

The 1998 HFQLG Act requires that the effectiveness of group selection be demonstrated in achieving an all-age, multistory, fire-resilient forest. It calls for a pilot project to carry out group selection prescriptions described in the Quincy Library Group Community Stability Proposal over an average of 0.57% of the pilot project land area each year (or 5.7% each decade), using the most cost effective means available. Group selections are intended to promote an adequate timber supply and local economic stability, maintain a relatively continuous forest cover, create a forest that would closely mimic the historical natural landscapes of the Sierra Nevada, and employ rotation ages that vary by timber site quality.

The Creeks project group selections are designed to contribute to goals of the 1998 HFQLG Act while meeting requirements of the amended Forest Plan. Project design is intended to maximize the contribution of the project to the group selection acreage goals noted above, consistent with protection of ecosystems, watersheds, and other forest resources; good silvicultural practices; and economic efficiency. To achieve this purpose, lands supporting important environmental and social resources, as well as silviculturally unsuited lands, were excluded from the placement of groups, including off-base and deferred lands (as required by the 1998 HFQLG Act), RHCAs, spotted owl protected activity centers (PACs) and habitat areas (SOHAs), late-successional old growth ranks 4 and 5, administrative sites, critical wildlife habitat, recreation sites, plantations established after 1960, and shrubfields.

Group selections provide conditions for the regeneration and growth of more fire tolerant pine species that otherwise do not grow well in a shaded environment underneath an overstory. Group selections provide recruitment of future overstory pine, and provide structural diversity by creating small patches of vegetation and young trees interspersed in stands of larger trees.

5. The proposed action is intended to implement economically efficient treatments to reduce hazardous fuels and to contribute to community stability.

The 1998 HFQLG Act requires that the pilot project carry out authorized activities using the most cost effective means available. The proposed action treatments need to be designed utilizing cost-effective methods in order to minimize the cost of implementing the treatments to the government.

The Creeks Forest Health Recovery Project is needed to contribute to community stability by providing employment for contractors involved in the removal of wood by-products, for employees in wood manufacturing and energy production plants, and for personnel involved in labor intensive work. The project is also needed to provide a wood supply for local manufacturers who rely on federal timber to keep local plants in operation.

6. The proposed action is intended to provide the necessary access for the construction of the DFPZs, group selection timber harvest, and area thinning, and to reduce impacts of the transportation system.

In order to provide access for the construction of the DFPZs, group selection timber harvest, and area thinning, the existing Forest transportation system in the project area would be utilized. In addition, approximately 1.9 miles of currently existing unclassified roads are needed for long-term future management and thus would be added to the Forest transportation system. Upgrading these additional roads to Forest transportation standards is needed to reduce the potential that these roads cause environmental harm.

The use of temporary roads is also needed to provide access for the construction of the DFPZs, group selection timber harvest, and area thinning. These roads are short-term facilities not needed for future management and thus would be obliterated at the end of project use.

Decommissioning of approximately 1.2 miles of permanent system road is needed because these roads have, through analysis, been determined to be unneeded for future management.

Proposed Action

The Forest Service proposes using a combination of commercial timber sales, service contracts, and Forest Service crews to: 1) develop a network of DFPZs on approximately 5,905 acres, 2) conduct area thinning on approximately 3,285 acres, and 3) establish group selection harvest units on approximately 1,245 acres on National Forest land within the Creeks Project area. Included in this proposal are the construction of approximately 1.9 miles of National Forest system roads, the use of approximately 8.7 miles of temporary roads, and the decommissioning of approximately 1.2 miles of system roads and 8.7 miles of the temporary roads created for this project. A detailed description of the Proposed Action activities is provided in the Alternatives section of this document.

Decision Framework

The decision to be made is whether to: 1) implement Alternative 1, the proposed action, 2) meet the purpose and need for action through Alternative 14, or 3) take no action at this time.

A decision on DFPZ maintenance would not be made at this time. Treatments of stand structures are designed to be effective for a minimum of 10 years, with a desired target efficacy of approximately 20 years. Some stands or portions of stands may require maintenance within ten years of the initial treatment. Maintenance treatments of surface fuels are not expected to be necessary for the first five years following the initial treatment. Therefore, DFPZ maintenance would be analyzed as a reasonably foreseeable action during the analysis of this project. A decision on this project is expected by September of 2005. Implementation could begin in 2006.

Public Involvement

The proposal was first listed in the Lassen National Forest Schedule of Proposed Actions (SOPA) on February 2004. In the SOPA, the mode of environmental documentation was predicted as an environmental assessment. The proposal was provided to the public and other agencies for comment during a formal "Opportunity to Comment" period as required by 36 CFR 215.6, from June 9, 2004 to July 9, 2004. A letter notifying the public of the opportunity to comment on the Creeks Proposed Action was mailed on June 04, 2004 to approximately 33 addresses of agencies, tribal governments, groups, and individuals. In addition, a legal notice of the proposed action and the formal opportunity to comment was placed in the newspaper of record (Lassen County Times, June 8, 2004) and in the local Chester Progressive newspaper (June 9, 2004).

Six letters were received from the June 2004 scoping period. A summary of comments received from the public is located in the project file and is hereby incorporated by reference.

Eight letters were received from the February 2005 comment period. From these eight responders, four had responded to the June 2004 scoping, and four were new responses to the February 2005 scoping. These comments were combined with the June 2004 comments and were analyzed for any potential issues. A

summary of comments received from the public is located in the project file and is hereby incorporated by reference. Using the comments from agencies, tribal governments, groups and individuals, the interdisciplinary team developed a list of issues to address.

A Notice of Availability (NOA) of the Draft Environmental Impact Statement (DEIS) for the Creeks Forest Health Recovery Project was published in the Federal Register on May 27, 2005. The NOA invited comments on the DEIS and stated that comments would be accepted for 45 calendar days following the date of publication in the Federal Register. In addition, a letter was sent to 37 individuals and groups who had responded to scoping, or who had expressed interest in this project, and to agencies and tribal governments of the opportunity to comment on the DEIS. This letter was mailed on May 18, 2005. A legal notice was published in the Lassen County Times on June 7, 2005 also stating the availability of the DEIS and announcing the Opportunity to Comment. Four more requests for the DEIS were received following the publication of the NOA and legal notice.

Comments received on the DEIS, and Forest Service responses to comments, are found in Appendix C. A combination of 34 letters, e-mails, and FAXs were received with comments on the DEIS.

Issues

The Forest Service separated the issues into two groups: significant and non-significant issues. Significant issues are defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues are identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Sec. 1501.7, "...identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)..." One significant issue was identified during the comment period on the DEIS. A list of non-significant issues and reasons regarding their categorization as non-significant may be found in the project file.

Significant Issue

Maintenance of habitat connectivity between areas of suitable habitat for the California spotted owl and American marten

The proposed action would harvest timber in an area described as an "area of concern" for the California spotted owl within the 2001 SNFPA EIS and could exacerbate concerns regarding the owl's distribution and the connectivity of habitat.

The proposed action would degrade habitat connectivity for American marten in the north-south direction of the project area, and therefore is inconsistent with the Lassen LRMP as amended.

The proposed loss and degradation of suitable habitat would have unknown effects to spotted owl site occupancy, survival and reproduction.

The indicators that were used to measure this issue, as well as show comparisons between alternatives, are

1. Changes in the amount of suitable owl habitat acres within the area of concern, as mapped under the 2001 SNFPA EIS.
2. Change in acres of suitable habitat for California spotted owl within the nest core and breeding territory.

3. Change in acres and quality of connectivity through canopy closure and near-ground cover for the American marten.

Alternative 14 was developed to respond to this issue. The objective of Alternative 14 is to maintain existing suitable spotted owl and marten foraging habitat in key areas that are predominately CWHR 4M and 4D. Ten percent of the treatment unit would consist of non-treatment leave islands which would emphasize maintaining small diameter tree canopies. Post treatment canopy closure of trees greater than 6 inch dbh would average 40 to 45 percent canopy closure immediately after treatment. Details can be found in Chapter 2, alternatives considered in detail.

Laws, Regulations, and Policies

All resource management activities described and proposed in this document would be implemented to the extent that they are consistent with applicable Federal law, United States Department of Agriculture (USDA) regulations, and Forest Service policies. The major laws and their applicability to the proposed action are as follows:

Civil Rights Impact Analysis (USDA Regulation 4300-4)

A Civil Rights Impact Analysis was completed for the 1999 HFQLG FEIS (Appendix O). Three categories were analyzed: (1) work force characteristics, (2) attitudes/beliefs/values, and (3) civil rights. Favorable impacts, unfavorable impacts, and mitigations were identified for each of the three categories.

Clean Water Act (Public Law 92-500)

All Federal agencies must comply with the provisions of the Clean Water Act. The Clean Water Act regulates forest management activities near federal waters and riparian areas. The proposed action meets the terms of the Clean Water Act for non-point sources of pollution, primarily pollution caused by erosion and sedimentation. As described in the 1999 HFQLG FEIS, compliance with the Clean Water Act is accomplished through implementation of Best Management Practices (BMPs) for National Forests in California (USDA FS 2000a).

The State and Regional Water Quality Control Boards entered into agreements with the U.S. Forest Service to control nonpoint source discharges by implementing control actions certified by the State Water Quality Control Board and the EPA as BMPs. BMPs are designed to protect and maintain water quality and prevent adverse effects to beneficial uses both on-site and downstream. In addition, the land disturbing activities described in the proposed action would be dispersed in time and space so that the subwatersheds would not reach or exceed the threshold of concern for overall watershed disturbance.

Clean Air Act (Public Law 84-159)

Forest Service managers would follow specified provisions for smoke management whenever fire is prescribed for pile and understory burning. The following documents provide Forest Service managers with the guidance and direction for smoke management to protect air quality: (1) Interim Air Quality Policy on Wildland and Prescribed Fires, issued by the Environmental Protection Agency in 1998; (2) Memorandum of Understanding between the California Air Resources Board (CARB) and the USDA Forest Service, signed on July 13, 1999; and (3) Smoke Management Guidelines in Title 17 of the Code of Federal Regulations.

The project area lies within the both the Plumas County Northern Sierra Air Quality Management District and the Butte County Air Pollution Control District. As a matter of regional policy, a smoke management plan

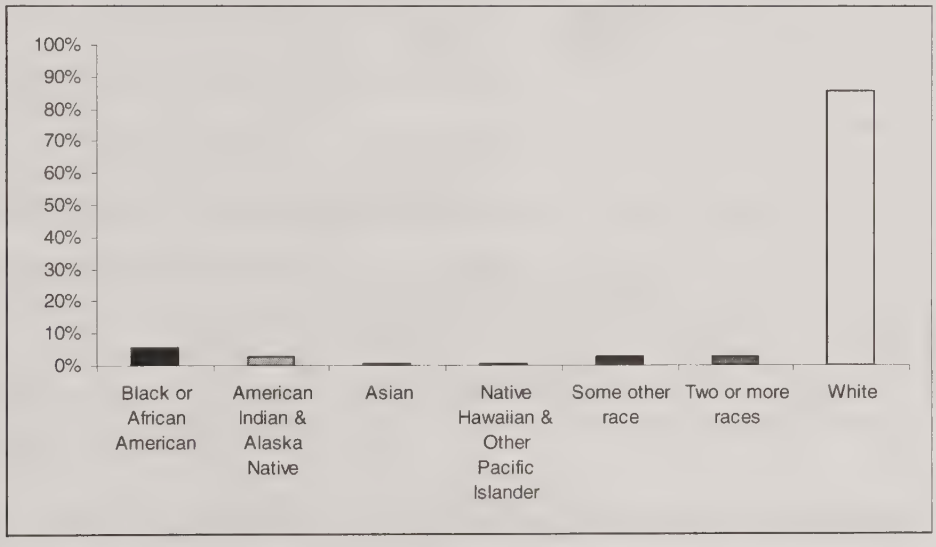
would be submitted to and approved by involved agencies prior to any burning that would occur within the Creeks Project area. Several communities lie within proximity of the areas where both pile and prescribed burning is proposed to occur. Adherence to the smoke management plan for pile and understory burning would alleviate negative impacts to communities. By adhering to a smoke management plan approved by the Lassen National Forest Supervisor and the appropriate air quality management district, particulate matter emissions from pile or understory burning would not violate California Ambient Air Quality (CAAQ) emission standards.

Environmental Justice (Executive Order 1289)

Executive Order 1289 on Environmental Justice requires all federal agencies to identify and consider disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority, or low-income populations. The proposed actions were analyzed in the 1999 HFQLG FEIS in relation to potentially adverse environmental, health, social, or economic effects on low-income or minority populations.

The Figure 1-2, below, highlights demographic statistics for identifying potential communities of concern. There are no communities near the Creeks Project area with significant low-income or minority populations. Therefore, specific actions to address environmental justice concerns were not implemented for this project.

Figure 1-2. Total Population by Race for Lassen, Plumas, and Sierra Counties



Source: Sonoran Institute Economic Profile System (2002), ttp://www.sonoran.org/programs/eps/si_se_epsindex.html.

Endangered Species Act OF 1973 (Public Law 93-205)

Section VII of the Endangered Species Act requires Federal agencies to consult with the United States Department of the Interior Fish and Wildlife Service (Service) and/or the United States Department of Commerce National Marine Fisheries Service (NMFS), whichever is appropriate, during project planning when Threatened or Endangered species, or their associated critical habitat, may be affected by a project. Consultation was not required for the Creeks Project because no Threatened or Endangered species, or their associated critical habitat, would be affected by this project.

Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 136 as amended)

The Federal Insecticide, Fungicide, and Rodenticide Act, as amended (7 U.S.C. 136), is the authority for the registration, distribution, sale, shipment, receipt, and use of pesticides (collective for insecticides, fungicides, and rodenticides). The Forest Service may use only pesticides registered or otherwise permitted in accordance with this act. In addition, the Forest Service in Region 5 must comply with California State laws and regulations regarding pesticides. Also, Forest Service policy in Region 5 is to only use EPA and California-registered pesticides. The action alternatives include the use of an EPA registered borate compound on cut stumps that are 14 inches diameter and greater for the prevention of annosus root disease. The borate compound is considered a fungicide.

Herger-Feinstein Quincy Library Group Forest Recovery Act of 1998 (Title IV, Section 401)

Forest Supervisors for the Plumas, Lassen, and Tahoe National Forests signed a ROD for the HFQLG FEIS in August 1999. The ROD amended the three Forest Plans to establish a pilot project to demonstrate and test the effectiveness of management activities described in the HFQLG Act of October 21, 1998. The Creeks Project incorporates all of the elements of that decision, including the forest plan amendments.

Migratory Bird Treaty Act of 1918 as amended (16 USC 703-712)

The original 1918 statute implemented the 1916 Convention between the United States and Great Britain (for Canada) for the protection of migratory birds. Later amendments implemented treaties between the United States and Mexico, Japan, and the Soviet Union (now Russia). Specific provisions in the statute include the establishment of a Federal prohibition, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention . . . for the protection of migratory birds . . . or any part, nest, or egg of any such bird." Because forestlands provide a substantial portion of breeding habitat, land management activities within the Lassen National Forest can have an impact on local populations.

National Forest Management Act OF 1976 (NFMA; Public Law 94-588)

The National Forest System lands affected by the Creeks Project are subject to management direction in the 1993 LNF LRMP as amended by the 1999 HFQLG ROD and the 2004 SNFPA ROD. The Forest Plan, as amended, guide management of all National Forest lands and resources within the Creeks Project area. It includes direction for forest management, goals and objectives, standards and guidelines, area management direction, and the anticipated outputs of forest products.

The LRMP, as amended, has been reviewed in consideration of the Creeks Project. This project is responsive to guiding direction contained in the Plan, is consistent with the standards and guidelines contained in the Plan, and is consistent with the requirements for management prescriptions.

National Historic Preservation Act (Public Law 89-665)

The proposed action is in conformance with regulations of the National Historic Preservation Act (NHPA), 1966, as amended (P.L. 89-665, 80 Stat.915); the National Environmental Protection Act (1969), Archaeological Resources Protection Act of 1979 (ARPA), Native American Grave Protection and Repatriation Act (1990: P.L. 101-601), and American Indian Religious Freedom Act (1978: P.L. 95-341), and as called for by the 1996 First Amended Regional Programmatic Agreement Among The U.S.D.A. Forest Service, Pacific Southwest Region California State Historic Preservation Officer, And Advisory Council On Historic Preservation Regarding The Process For Compliance With Section 106 Of The National Historic Preservation Act For Undertakings On The National Forests Of The Pacific Southwest Region (Regional PA), and the 2004 Interim Protocol for Non-Intensive Inventory Strategies for Hazardous Fuels and Vegetation Reduction Projects (Interim Protocol).

Wild and Scenic Rivers Act (Public Law 90-542, as amended)

The proposed action is consistent with provisions of the Wild and Scenic Rivers Act, which regulates forest management activities within the National Wild and Scenic Rivers System. Specifically, these lands are to be administered in such a manner as to protect and enhance the values that caused them to be included in the system, without limiting other uses that do not substantially interfere with public use and enjoyment of these values. The primary emphasis is given to protecting these lands' aesthetic, scenic, historic, archaeological, and scientific features and to maintaining the free-flowing character of the system river. The Secretary of Agriculture may utilize the general statutory authorities relating to the National Forests to carry out the purposes of this Act.

There are no Wild and Scenic Rivers within the Creeks Project area.

Permits and Coordination

The Forest Service coordinates its activities with Federal, County, and State of California regulatory agencies, including air quality management districts, and water quality control boards. Permits would be required from the air quality management districts prior to prescribed burning. Conditional waivers of the requirement to file a report of waste discharge for timber harvest activities on National Forest lands would be required from the appropriate water quality control boards.

Chapter 2: Alternatives

Introduction

This chapter presents and compares three action alternatives considered in detail for the Creeks Forest Health Recovery Project. These alternatives include Alternative 1 - Proposed Action, Alternative 2 - No Action, and Alternative 14, a new alternative developed to address the significant issue identified during the comment period of the DEIS. Since publication of the DEIS, two alternatives have been added. Each of these alternatives was numbered consecutively. Alternative 13 is an alternative considered and not analyzed, while Alternative 14 was considered in detail.

Alternatives Considered in Detail

The Forest Service analyzed the Alternative 1 (Proposed Action), Alternative 2 (No action), and Alternative 14 in detail.

Alternative 1 – Proposed Action

Table 2-1 summarizes the approximate vegetation treatment acres included in the Proposed Action. A detailed discussion of treatments follows Table 2-1 and Figure 2-1.

Defensible Fuel Profile Zones

DFPZ locations and boundaries were refined from those identified in the HFQLG FEIS (1999) based on site-specific review by District specialists. Treatments are designed to achieve DFPZ conditions as described in the HFQLG FEIS (1999, Appendix J, page 5), and comply with the standards and guides set forth in the 2004 SNFPA ROD (pages 67-68). Stands would be fairly open and dominated by larger, fire tolerant trees. The openness of crown fuels, reduced numbers of small understory trees and low amounts of surface fuel would produce a very low probability of sustained crown fire. Post-treatment stands would more closely reflect a fuel Condition Class I (Laverty, 2000).

Stocking would be retained towards the lower end of full site occupancy. Stand basal area would generally range from 150 - 250 square feet. Typically, a 90-year-old mixed conifer stand of moderate site quality would average between 175 - 200 square feet of basal area per acre. Stand basal area is the cross-sectional area of live tree stems calculated at diameter at breast height (dbh, or 4.5 feet from the ground), and is used as a measure of site occupancy. Canopy cover would generally average between 30 – 50%. Residual overstory trees would be irregularly spaced across the landscape. Small groups of typically 3-6 closely spaced overstory trees would be left to retain structural diversity; however, overstory canopy fuels would overall be discontinuous. Understory small diameter conifer trees (6 inch dbh or less; diameter measured at 4.5 feet from ground level) would be relatively few and scattered, approximately 50 trees per acre or less. Where oaks occur, approximately 25 square feet per acre of basal area of the largest oaks (6 inches dbh or greater) would be retained where they can be isolated from serving as ladder fuels.

Table 2-1. Summary of Proposed Action Vegetative Treatments and Yarding Systems.

Prescription	Treatment	Mechanized Acres	Cable Acres	Helicopter Acres	Hand Acres	Total
A	DFPZ; surface and ladder fuels, slopes < 35%	1,420				1,420
A	DFPZ; surface and ladder fuels, slopes 35%+				35	35
B	DFPZ; surface, ladder, and canopy fuels, slopes <35%	3,775				3,775
B	DFPZ; surface, ladder, and canopy fuels, slopes 35%+		280			280
C	DFPZ; surface, ladder, and canopy fuels in CWHR 5M, 5D, and 6 class stands, slopes <35%	360				360
C	DFPZ; surface, ladder, and canopy fuels in CWHR 5M, 5D, and 6 class stands, slopes 35%+		35			35
					Total DFPZ acres	5,905
F	Area Thin; surface and ladder fuels, slopes <35%	515				515
F	Area Thin; surface and ladder fuels, slopes 35%+				25	25
G	Area Thin; surface, ladder, and canopy fuels, slopes <35%	735				735
G	Area Thin; surface, ladder, and canopy fuels, slopes 35%+		30			30
H	Area Thin; surface, ladder, and canopy fuels in CWHR 4M, 4D, 5M, 5D, and 6 class stands, slopes <35%	1875				1,875
H	Area Thin; surface, ladder, and canopy fuels in CWHR 4M, 4D, 5M, 5D, and 6 class stands, slopes 35%+		105			105
					Total Area Thin Acres	3,285
	Group Selection; slopes <35%	1,040				1,040
	Group Selection; slopes 35%+		30	175		205
					Total Group Selection Acres	1,245
	Total Acres by Harvest System and Treatment	9,720	480	175	60	10,435

Note: Prescription D is a Almanor Ranger District prescriptions not used in this project. Prescription E is used in Alternative 14.
Source: Almanor Ranger District GIS

Snags would be retained following the snag retention guidelines for this project. Standing dead fuels in excess of this would be cut and either removed or left on site. Trees that are suppressed, of poor health or diseased would be removed in favor of healthy trees. Pockets of dead and dying trees would be cut as they occur within the DFPZ where they are in excess of the snag retention guidelines. These would create small openings that would be averaged into overall stocking and canopy cover. Areas of understocking would be site prepared, by piling and burning, and may be interplanted if natural regeneration is not expected to sufficiently restock the area within five years.

Surface fuels of down woody material greater than 12 inches diameter would be retained at 10-15 tons per acre, where it exists. Small surface fuels 12-inch diameter or less would be retained at no more than 5 tons per acre. Prescribed fire would be used in most stands to either burn piles or broadcast burn surface fuels. All prescribed fire implementation would follow a specific Burn Plan that follows Region 5 standards and guidelines and has been approved by the Lassen National Forest Supervisor.

It should be noted for the following prescription discussions on slopes 35% or less, whole tree yarding would be used as much as possible. Whole tree yarding is most effective using ground based equipment, while helicopter and cable yarding would utilize this technique to a lesser degree.

Operability: Live trees larger than 30 inches dbh would be retained except as necessary for operability. For example, in the last 10 years of implementing similar prescriptions on the Almanor Ranger District, there have only been a few occasions where a trees 30 inches dbh or greater were removed for operability. These included trees that were removed to create a landing or as identified as a hazard tree per the Occupational Safety and Health Act (OSHA) requirement for logging operations and is consistent with page 68 of the 2004 SNFPA ROD.

Prescription A. DFPZ Surface and ladder fuels:

Surface fuels and ladder fuels, small trees generally up to 12 inches dbh, would be thinned to reduce fuel continuity. Occasional midstory trees up to 20 inches dbh may be treated to break up fuel continuity and favorably retain adjacent smaller healthy trees. An example would be cutting an unhealthy or damaged 14 inches tree to retain and isolate a healthy 11 inches tree from being a ladder fuel. Stand overstory structure and canopy closure would not be appreciably altered by these treatments, except within plantations. Plantations are included in this treatment category due to the size of treated material and the proximity of crown fuels to surface fuels. These young stands would be thinned to approximately 170 – 200 trees per acre.

Slopes 35% or less: Stands would generally be treated mechanically. Mechanical treatments would primarily entail mastication (crushing) or machine piling. Treatments may include mechanically chipping and removing treated fuels where economically feasible. Hand treatments may be applied in areas of lighter fuel concentrations. Hand treatments would include hand thinning, bucking (cutting) and piling surface and small ladder fuels.

Slopes greater than 35%: On sustained slopes steeper than 35%, stands would be cut by hand. Treatments would include hand thinning, bucking (cutting) and piling surface and small ladder fuels.

Prescription B. DFPZ Surface, ladder and canopy fuels:

Surface, ladder and canopy fuels would be thinned and stands would be thinned from below. Treatments would reduce fuel continuity and overall stocking density. Small understory conifer trees would be thinned where they serve as ladder fuels to adjacent overstory trees. Mid and upper story trees would be removed to protect adjacent "leave" trees and break up ladder and canopy fuel continuity. Live trees larger than 30 inches dbh would be retained except as necessary for operability.

Slopes 35% or less: Ground based equipment would be utilized to remove ladder and canopy fuels, with whole tree yarding applied wherever feasible to reduce fuel loadings. Surface fuels would be mechanically or hand treated. Surface fuel mechanical treatments would primarily entail machine piling but could include

mastication or chipping and removing treated fuels. Hand treatments would include hand thinning, bucking and piling surface and small ladder fuels.

Slopes greater than 35%: On slopes steeper than 35%, cable logging systems would be used to remove canopy, and surface, and ladder fuels, as feasible. Additional treatments such as mechanical chipping and spreading, or yarding with small cable systems, such as a zigzag yarder, may be used where residual surface and ladder fuels are excessive, and burning them would cause undesirable damage to the residual stand. Hand treatments including hand thinning, bucking (cutting) and piling would be used where surface and ladder fuels could be safely and effectively treated on site.

Prescription C. DFPZ Surface, Ladder and Canopy Fuels in CWHR 5M, 5D, and 6 Size Stands:

Stocking levels and canopy cover in stands classified as California Wildlife Habitat Relationships (CWHR) 5M, 5D and 6 would be retained at the upper end of the desired range for a DFPZ. Canopy cover would be retained at approximately 40 – 50% with a corresponding basal area averaging approximately 200 – 250 square feet per acre. Emphasis would be placed on breaking up overall fuel continuity while maintaining cover and stand heterogeneity. Small understory trees would be thinned where they serve as ladder fuels to adjacent overstory trees. Mid and upper story trees would be removed to protect adjacent "leave" trees by breaking up ladder and canopy fuel continuity. Live trees larger than 30 inches dbh would be retained except as necessary for operability.

Slopes 35% or less: Ground based equipment would be utilized to remove ladder and canopy fuels, with whole tree yarding applied wherever feasible to reduce fuel loadings. Surface fuels would be mechanically or hand treated. Surface fuel mechanical treatments would primarily entail machine piling but could include mastication or chipping and removing treated fuels. Hand treatments would include hand thinning, bucking (cutting) and piling surface and small ladder fuels.

Slopes greater than 35%: On sustained slopes steeper than 35%, cable logging systems would be used to remove canopy fuels and surface and ladder fuels, as feasible. Additional treatments such as mechanical chipping and spreading, or yarding with small cable systems, may be used where residual surface and ladder fuels are excessive, and burning them would cause undesirable damage to the residual stand. Hand treatments including hand thinning, bucking (cutting) and piling would be used where surface and ladder fuels could be safely and effectively treated on site.

Area Thinning

The placement of area thinnings is designed to reinforce defensible fuel profile zones. Area thinnings help build a strategic network of reduced fuel concentrations where fire severity and rates of spread are appreciably reduced. Stands would be thinned with emphasis on breaking up fuel continuity, reducing disease, decadence and competition for site resources, and promoting structural diversity. In order to provide for uneven-aged structure, some healthy trees in all existing size classes would be retained where they don't serve as undesirable ladder or canopy fuels. Live trees larger than 30 inches dbh would be retained except as necessary for operability.

Stocking would generally be retained at mid levels of full site occupancy. Stand basal area of a 90-year-old mixed conifer stand of moderate site quality would typically average between 200 - 250 square feet per

acre. Canopy cover would generally average between 40 – 50%. Residual mid and overstory trees would be irregularly spaced such that large-scale continuity of canopy fuels would be broken up. Understory small diameter trees (6 inch dbh or less) would be relatively few and isolated from serving as ladder fuels to the overstory. Where oaks occur, approximately 25 square feet of basal area of the largest oaks (6 inches dbh or greater) would be retained where they can be isolated from serving as ladder fuels.

Snags would be retained at 2-6 per acre following the snag retention guidelines for this project. Standing dead fuels in excess of this would be cut and either removed or left on site. Pockets of dead and dying trees would be cut as they occur within area thinnings where they are in excess of snag retention guidelines. These would create small openings that would be averaged into overall stocking and canopy cover. Areas of understocking would be site-prepared, by piling and burning, and may be interplanted if natural regeneration is not expected to sufficiently restock the area within five years. Prescribed fire would be used in most stands to either burn piles or broadcast burn surface fuels following thinning treatments. All prescribed fire would follow a specific Burn Plan that follows Region 5 standards and guidelines and has been approved by the Lassen National Forest Supervisor.

The area thinning treatment described below are designated as "F", "G", and "H". The letters "D" and "E" are not used as designators for treatments in this proposed action.

Prescription F. Area Thin Surface and Ladder Fuels:

Surface fuels and ladder fuels, small trees generally up to 12 inches dbh, would be thinned to reduce fuel continuity. Occasional midstory trees up to 20 inches dbh may be treated to break up fuel continuity and favorably retain adjacent smaller healthy trees. Example: cutting an unhealthy or damaged 14 inches tree to retain and isolate a healthy 11 inches tree from being a ladder fuel. Stand overstory structure and canopy closure would not be appreciably altered by these treatments, except within plantations. Plantations are included in this treatment category due to the size of treated material and the proximity of crown fuels to surface fuels. These young stands would be thinned to approximately 200 trees per acre.

Slopes 35% or less: Stands would generally be treated mechanically. Mechanical treatments would primarily include mastication or machine piling. Treatments may include mechanically chipping and removing treated fuels where economically feasible. Hand treatments may be applied in areas of lighter fuel concentrations. Hand treatments would include hand thinning, bucking (cutting) and piling surface and small ladder fuels.

Slopes greater than 35%: On sustained slopes steeper than 35%, stands would be cut by hand. Treatments would include hand thinning, bucking (cutting) and piling surface and small ladder fuels.

Prescription G. Area Thin Surface, Ladder and Canopy Fuels:

Surface, ladder and canopy fuels would be thinned to reduce fuel continuity, disease, decadence and competition for site resources. Small understory trees would be thinned where they serve as ladder fuels to adjacent overstory trees. Mid and upper story trees would be removed to break up ladder and canopy fuel continuity and promote the growth of adjacent "leave" trees. Live trees larger than 30 inches dbh would be retained except as necessary for operability.

Slopes 35% or less: Ground based equipment would be utilized to remove ladder and canopy fuels, with whole tree yarding applied wherever feasible to reduce fuel loadings. Surface fuels would be mechanically or

hand treated. Surface fuel mechanical treatments would primarily entail machine piling but could include mastication or chipping and removing treated fuels. Hand treatments would entail hand thinning, bucking and piling surface and small ladder fuels.

Slopes greater than 35%: On sustained slopes steeper than 35%, cable logging systems would be used. Additional treatments such as mechanical chipping and spreading, or yarding with small cable systems, such as a zigzag yarder, may be used where residual surface and ladder fuels are excessive, and burning them would cause undesirable damage to the residual stand. Hand treatments including hand thinning, bucking (cutting) and piling would be used where surface and ladder fuels could be safely and effectively treated on site.

Prescription H. Area Thin Surface, Ladder and Canopy Fuels in CWHR 4M, 4D, 5M, 5D, and 6 Size Stands:

Stocking in these stands would be retained at mid to upper levels of full site occupancy. Canopy cover would be retained near 50% and would not be reduced below 40%. Emphasis would be placed on breaking up overall fuel continuity while maintaining canopy cover. Small understory trees would be thinned where they serve as ladder fuels to adjacent overstory trees. Mid and upper story trees would be removed to break up ladder and canopy fuel continuity and promote the growth of adjacent "leave" trees. Live trees larger than 30 inches dbh would be retained except as necessary for operability.

Slopes 35% or less: Ground based equipment would be utilized to remove ladder and canopy fuels, with whole tree yarding applied wherever feasible to reduce fuel loadings. Surface fuels would be mechanically or hand treated. Surface fuel mechanical treatments would primarily entail machine piling but could include mastication or chipping and removing treated fuels. Hand treatments would include hand thinning, bucking (cutting) and piling surface and small ladder fuels.

Slopes greater than 35%: On sustained slopes steeper than 35%, cable logging systems would be used. Additional treatments such as mechanical chipping and spreading, or yarding with small cable systems, may be used where residual surface and ladder fuels are excessive, and burning them would cause undesirable damage to the residual stand. Hand treatments including hand thinning, bucking (cutting) and piling would be used where surface and ladder fuels could be safely and effectively treated on site.

Groups Selection Harvests

Groups would be placed in forest stands that have been identified as suitable for this method of uneven-aged management. These are lands that are capable of growing forest stands and are not precluded from timber harvest because of wildlife habitat allocations, land use or administrative constraints. Groups would range in size from ½ to 2 acres, averaging about 1½ acres over the project. Groups would generally be located within size class 3 stands (Region 5 size class). Size class 3 stands (CWHR 4) have diameters ranging from 12 to 24 inches dbh, but occasionally include larger trees. Approximately 5.7% of the available and suitable land base within the project area would be treated by group selection harvest under this proposal. This is based upon a projected 10-year re-entry period and equates to a group selection harvest level of 0.57 percent of the available land base per year. Live trees larger than 30 inches dbh would be retained except as necessary for operability. Snag retention would not occur within groups due to operations safety concerns. Surface fuels including residual slash and shrubs within the groups would be thinned so that small surface fuels (less than 12 inches diameter) would not exceed 5 tons per acre. Where it exists, 10-15 tons per acre of the largest down logs

greater than 12 inches diameter would be retained. Prescribed fire would be used in most groups to either burn piles or broadcast burn surface fuels. All prescribed fire implementation would follow an approved Burn Plan that follows Region 5 standards and guidelines.

Group selections within the true fir type may be naturally regenerated. In all other forest types, a combination of natural and artificial regeneration would be used to achieve desired stocking levels, with an emphasis on regenerating shade-intolerant species. Approximately 150 acres of group selection would be naturally regenerated. The remaining approximately 1150 acres of group selection would be interplanted, with natural regeneration seeding in from the group edges. Control of competing vegetation would be needed on approximately 900 acres to ensure the survival and growth of young conifer seedlings. This would be performed by hand grubbing or scalping, or mechanical mastication of competing plants. Animal damage control, including installing seedling protective barriers and trapping pocket gophers, would be conducted in groups where high deer use or gopher activity occurs. Animal damage control would be needed on approximately 400 acres. Plantation performance would be monitored after the 1st and 3rd years as required by the National Forest Management Act to ensure successful regeneration within 5 years after harvest (36 CFR 219.27). Reforestation Treatments are summarized in Table 2-2.

Slopes 35% or less: Use ground based equipment with whole tree yarding wherever feasible to reduce fuel loadings. Surface fuels would be mechanically or hand treated. Surface fuel mechanical treatments would primarily entail machine piling but could include mastication or chipping and removing treated fuels. Hand treatments would include hand thinning, bucking (cutting) and piling surface and small ladder fuels.

Slopes greater than 35%: On sustained slopes steeper than 35%, Groups that fall within a DFPZ or Area Thinning would be harvested using a cable logging system. Helicopter logging systems would be used elsewhere. Residual excess surface and ladder fuels would be hand treated. Hand treatments would include hand thinning, bucking (cutting) and piling or scattering the treated fuels.

Table 2-2. Group Selection Reforestation Treatments.

Forest Type	Group Size and Aspect	Reforestation Treatments
Pine, Mixed conifer	1 acre or larger, all aspects <1 acre, N to SE aspects	Plant 40:40:20 mixture of PP/JP/SP a minimum of ½ tree length away from group edge for initial stocking density of 250 TPA. Adjust species mix site specifically to include DF where it naturally occurs. Approximately 700 acres
Red fir, White fir	1.5 acre or larger, all aspects	Monitor post harvest for natural regeneration. Plan to plant 70:20:10 mixture of RF/WF/SP-WWP in Red fir zone, 50:20:20:10 WF/RF/JP/SP in White fir zone for initial stocking density of 250 TPA. Approximately 395 acres
All	All	Survey all groups for natural regeneration and planting survival at year 1 and year 3. Schedule interpolating where stocking levels are below R5 minimum levels or to promote pine regeneration.
All	1.5 acres or larger, all aspects	Release for survival within 1 year of planting - monitoring may adjust treatment timing. Approximately 900 acres
Pine, Mixed conifer	1.5 acre or larger, S to W aspect	Monitor for gopher activity and schedule trapping as needed to reduce seedling mortality. Approximately 225 acres.
White fir, Red fir	1.5 acres or larger, all aspects	Install browse protectors to prevent deer browse of terminal buds. Maintain for approximately 5 years or until terminal buds are above browse height.

Source: Almanor Ranger District Silviculturist

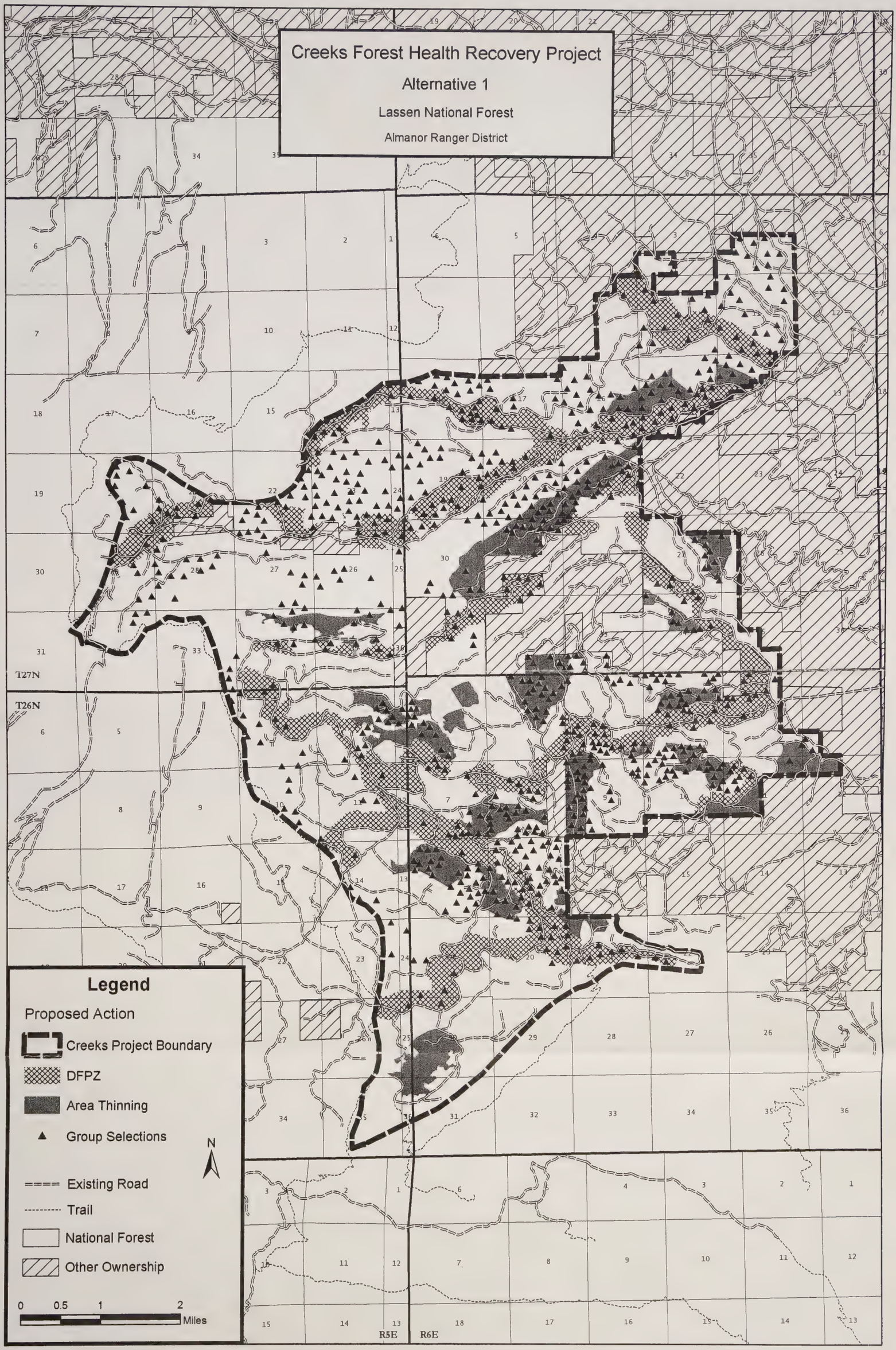


Figure 2-1 Alternative 1

Alternative 2 - No Action

The Proposed Action would not be implemented.

Alternative 14

This alternative was developed in response to the significant issue, which is to maintain habitat connectivity between areas of suitable habitat for the California spotted owl and American marten.

The objective of this alternative is to maintain existing suitable spotted owl and marten foraging habitat in key areas that are predominately CWHR 4M and 4D. Ten percent of the treatment unit would consist of non-treatment leave islands which would emphasize maintaining small diameter tree canopies. Post treatment canopy closure of trees greater than 6 inch dbh would average 40 to 45 percent canopy closure immediately after treatment. Table 2-3 displays vegetative treatments for Alternative 14 and Figure 2-2 displays the locations of activities under this alternative.

Operability: Live trees larger than 30 inches dbh would be retained except as necessary for operability. For example, in the last 10 years of implementing similar prescriptions on the Almanor Ranger District, there have only been a few occasions where a trees 30 inches dbh or greater were removed for operability. These included trees that were removed to create a landing or as identified as a hazard tree per the Occupational Safety and Health Act (OSHA) requirement for logging operations and is consistent with page 68 of the 2004 SNFPA ROD.

Defensible Fuel Profile Zones

All DFPZ fuel treatments for Alternative 14 are similar to Alternative 1, except for the change in the number of acres treated through Prescriptions B (and some small areas of Prescription A), and the subsequent treatment of these same acres through Prescription E. Prescription E would be applied to 612 acres. The main difference between this alternative and Alternative 1 is that the areas where Prescription E would be applied would retain a higher canopy closure than they would have under Prescriptions A and B.

Prescription E. DFPZ Surface and ladder fuels:

Surface, ladder and canopy fuels would be thinned and stands would be thinned from below. Treatments would reduce fuel continuity and overall stocking density. Small understory conifer trees would be thinned where they serve as ladder fuels to adjacent overstory trees. Mid and upper story trees would be removed to protect adjacent "leave" trees and break up ladder and canopy fuel continuity. Stocking levels and canopy cover would generally be retained at the upper end of the desired range for a DFPZ. Where existing stand conditions permit, canopy cover would be retained at approximately 40 – 45% with a corresponding basal area averaging approximately 200 -225 square feet per acre. Stands with initial canopy cover less than 40% would retain approximately 30% canopy cover. Small "leave islands" up to 1/4 acre in size would be left untreated over approximately 10% of the treatment units to provide a greater component of small sized trees and stand heterogeneity. Non-treatment "leave islands" would be scattered throughout treatment units but would be placed a minimum of 100 feet away from roads to provide for firefighter safety. Emphasis would be placed on breaking up overall fuel continuity while maintaining cover and stand heterogeneity. Live trees larger than 30 inches dbh would be retained except as necessary for operability.

Surface fuels of down woody material greater than 12 inches diameter would be retained at 15 - 20 tons per acre, where it exists. Small surface fuels 12-inch diameter or less would be retained at no more than 5 tons per acre. Prescribed fire would be used in most stands to either burn piles or broadcast burn surface fuels. All prescribed fire implementation would follow a specific Burn Plan that follows Region 5 standards and guidelines and has been approved by the Lassen National Forest Supervisor.

Slopes 35% or less: Ground based equipment would be utilized to remove ladder and canopy fuels, with whole tree yarding applied wherever feasible to reduce fuel loadings. Surface fuels would be mechanically or hand treated. Surface fuel mechanical treatments would primarily entail machine piling but could include mastication or chipping and removing treated fuels. Hand treatments would include hand thinning, bucking and piling surface and small ladder fuels.

Slopes greater than 35%: This prescription does not apply to any slopes over 35%.

Area Thinning

All area thinning fuel treatments for Alternative 14 are similar to Alternative 1 except that 53 acres of group selections would not be implemented within this treatment type. The dropped group selection units would be retained as non-treatment "leave islands."

Groups Selection Harvests

Group selection harvests for Alternative 14 are similar to Alternative 1 except for the reduction of 53 acres within area thinning units as noted in the Area Thinning section above, and 6 acres within the two new GPACs.

Table 2-3. Summary of Vegetative Treatments and Yarding Systems for Alternative 14.

Prescription	Treatment	Mechanized Acres	Cable Acres	Helicopter Acres	Hand Acres	Total
A	DFPZ; surface and ladder fuels, slopes < 35%	1,360				1,360
A	DFPZ; surface and ladder fuels, slopes 35%+				35	35
B	DFPZ; surface, ladder, and canopy fuels, slopes <35%	3,223				3,223
B	DFPZ; surface, ladder, and canopy fuels, slopes 35%+		280			280
C	DFPZ; surface, ladder, and canopy fuels in CWHR 5M, 5D, and 6 class stands, slopes <35%	360				360
C	DFPZ; surface, ladder, and canopy fuels in CWHR 5M, 5D, and 6 class stands, slopes 35%+		35			35
E	DFPZ; surface and ladder fuels, 10% leave islands, slopes < 35%	612				612
E	DFPZ; surface and ladder fuels, slopes 35%+					0
					Total DFPZ acres	5,905
F	Area Thin; surface and ladder fuels, slopes <35%	515				515
F	Area Thin; surface and ladder fuels, slopes 35%+				25	25
G	Area Thin; surface, ladder, and canopy fuels,	735				735

Prescription	Treatment	Mechanized Acres	Cable Acres	Helicopter Acres	Hand Acres	Total
	slopes <35%					
G	Area Thin; surface, ladder, and canopy fuels, slopes 35%+		30			30
H	Area Thin; surface, ladder, and canopy fuels in CWHR 4M, 4D, 5M, 5D, and 6 class stands, slopes <35%	1875				1,875
H	Area Thin; surface, ladder, and canopy fuels in CWHR 4M, 4D, 5M, 5D, and 6 class stands, slopes 35%+		105			105
					Total Area Thin Acres	3,285
	Group Selection; slopes <35%	983				983
	Group Selection; slopes 35%+		30	173		203
					Total Group Selection Acres	1,186
	Total Acres by Harvest System and Treatment	9,663	480	173	60	10,376

Note: Prescription D is a Almanor Ranger District prescriptions not used in this project.
Source: Almanor Ranger District GIS

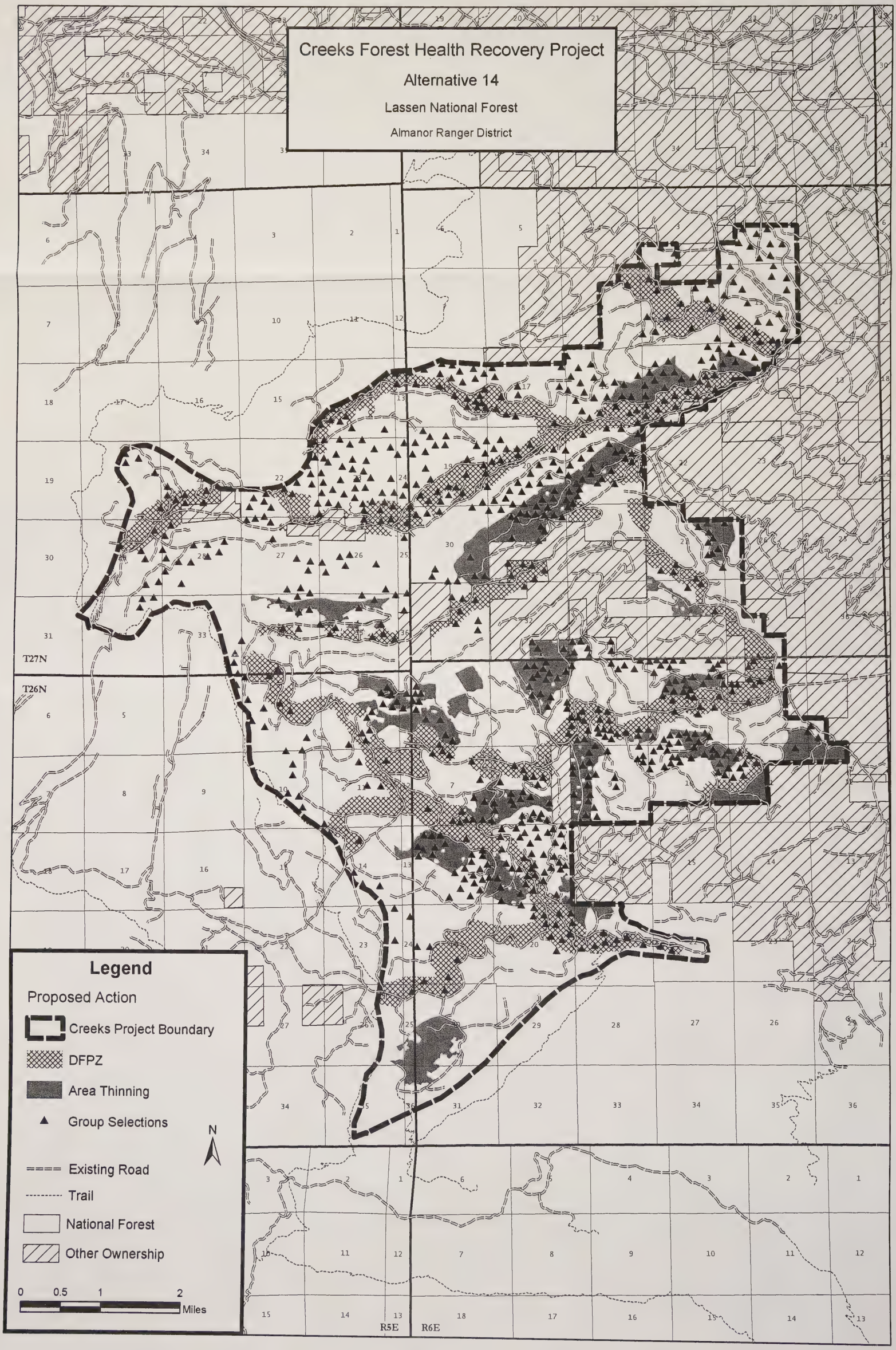


Figure 2-2 Alternative 14

Elements Common to Both Action Alternatives

Between the DEIS and this FEIS, two goshawk nest sites were found within the project area and two new 200-acre PACs (GPACs) were created around these nest sites. Under Alternative 1, four group selection harvest units are proposed to occur in the area where the one of the new GPACs were located. However, these types of activities are not consistent with current direction. Therefore, under both alternatives, these group selections would not be implemented and are dropped from further analysis.

The following road management and integrated design features would be implemented under both Alternatives 1 and 14.

Road Management

The following transportation system action items would be implemented with this project:

- Construct approximately 1.9 miles of permanent system road. These roads are existing unclassified roads that would be brought up to transportation standards and added to the Forest transportation system.
- All roads used for the project would receive pre-haul maintenance, including drainage structure inspection, improvement and repair, surface grading for drainage, road surfacing at stream crossings, and surface augmentation where needed on up to 46 miles of road.
- Construct approximately 8.7 miles of temporary road. This would consist of utilizing approximately 5.0 miles of existing unclassified road, and constructing approximately 3.7 miles of new temporary road. All temporary roads would be decommissioned upon completion of the project (see Soil Quality Standards and Best Management Practices under Integrated Design Features below).
- Decommission approximately 1.2 miles of permanent system road that are not needed for future management activities.
- Improvement of one existing water source (Upper Yellow Creek) and development of one water source (Yellow Creek at crossing of road 27N04). The improvement would consist of restoring capacity of the water hole and improvements to vehicle barriers to bring the site in compliance with Best Management Practices (BMPs) designed to protect water quality. BMPs are described in: Water Quality Management for Forest System Lands in California, Best Management Practices (USDA FS, 2000a) and SNFPA Record of Decision, 2004. Development would involve providing access from 27N04 to a man made pond, with surfacing, drainage and barriers to meet Best Management Practices.

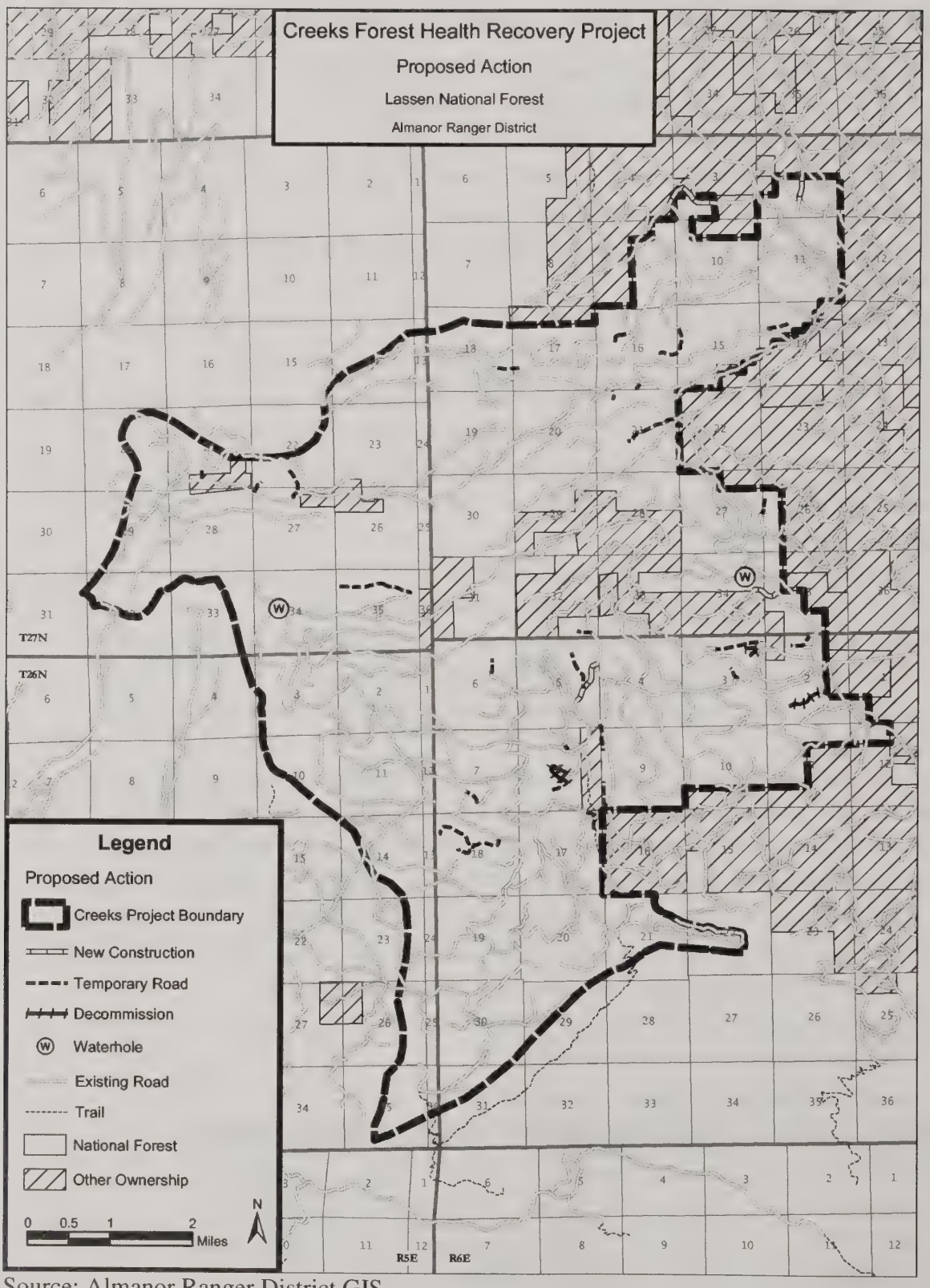
Table 2-4 summarizes changes to the transportation system that would be made with this project. Figure 2-3 shows the locations of changes to the transportation system.

Table 2-4. Summary of transportation system activities (miles)

Proposed Action	Permanent System Roads	Unclassified Roads
Construction	-	1.9 miles
Temporary Road Const.	-	5.0 miles existing 3.7 miles new
Decommission	1.2 miles	8.7 existing & new temp
Water Source Activities	2 locations	-

Source: Almanor Ranger District GIS

Figure 2-3. Creeks Project, Proposed Action – Transportation System Activities



Source: Almanor Ranger District GIS

Integrated Design Features

Integrated Design Features are elements of the project design that are applied in treatment areas. These features were developed to reduce or avoid adverse environmental effects of the proposed action to forest resources.

Riparian Area Management

Scientific Analysis Team (SAT) guidelines would be implemented (Tables 2.6 thru 2.10 of the HFQLG ROD, 1999) for the protection of aquatic habitats, otherwise known as Riparian Habitat Conservation Areas (RHCAs). Treatments would be applied to reduce the potential for high intensity fire within riparian habitat conservation areas. Additionally, treatments are designed to meet Riparian Management Objectives (RMOs), with prescriptions varying by habitat type. Applicable Best Management Practices (BMPs) would be implemented.

Management within RHCAs

Seasonally Flowing Streams

This prescription would also be applied to wetlands less than 1 acre in size, with the exception of fens (wet meadows), which have separate guidelines (included under integrated design features for Botany).

- Width: RHCAs would generally be 100 feet (each side of channel) in width along seasonally flowing streams. Widths would be adjusted to include riparian vegetation, unstable lands, floodplains and inner gorge landforms.
- Activities: Ground based systems - The RHCA is composed of an inner zone (50 ft in width) where mechanized entry would not be allowed, and outer zone, where mechanized entry would be limited. Forest fuels can be removed from the inner zone by mechanized grapples, end-lining, or hand thinning. In the outer zone, feller-buncher type machinery could be used, but there would be no construction of new landings or skid trails. Existing skid trails and landings may be used in the outer zone by approval. Cable systems - Cable yarding would occur within RHCAs only where full suspension could be achieved.
- Broadcast burning would be allowed within RHCAs, but there would be no ignitions in the inner zone (fire may back through this zone). Where fuel concentrations exceed 5 tons/acre (0-12 inch size class) following treatment, hand piling of slash may be required. All hand piles would be located a minimum of 50 feet from the edge of channel.
- Silvicultural Prescription: The appropriate DFPZ or area thinning prescription would be applied in the outer zone. Prescriptions for CWHR, 5M, 5D and 6 size stands would be applied within the inner zones of RHCAs. This prescription is modified such that no trees with root mass in channel banks (or canopy above channel banks) would be removed. No riparian hardwood species (alder, willow, etc.) would be cut. No group selection harvest units would be placed within the RHCAs.

Wetlands Greater than One Acre in Size

The following guidelines pertain to wetlands greater than one acre in size, with the exception of fens (wet meadows), which have separate guidelines (included under integrated design features for Botany).

- Width: RHCAs would generally be 150 feet in width (each side). Widths would be adjusted to include riparian vegetation

- Activities: Ground based systems - The RHCA is composed of an inner zone (75 ft in width) where mechanized entry would not be allowed, and an outer zone where mechanized entry would be limited. Forest fuels can be removed from the inner zone by mechanized grapples, end-lining, or hand thinning. In the outer zone, feller-buncher type machinery could be used, but there would be no construction of new landings or skid trails. Existing skid trails and landings may be used in the outer zone by approval. Cable systems - Cable yarding would occur within RHCAs only where full suspension could be achieved.
- Broadcast burning would be allowed within RHCAs, but there would be no ignitions in the inner zone (fire may back through this zone). Where fuel concentrations exceed 5 tons/acre (0-12 inch size class) following treatment, hand piling of slash may be required. All hand piles would be located a minimum of 50 feet from the edge of the meadow.
- Silvicultural Prescription: The appropriate DFPZ or area thinning prescription would be applied in the outer zone. Within the inner zone, removal of large material would be minimal due to limitations on equipment entry. This prescription is modified such that no trees with root mass in channel banks (or canopy above channel banks) would be removed. No riparian hardwood species (alder, willow, etc.) would be cut. No group selection harvest units would be placed within the RHCAs.

Perennial Fish Bearing Streams

- Width: RHCAs would generally be 300 feet in width (each side) on perennial channels. Widths would be adjusted to include riparian vegetation, unstable lands, floodplains and inner gorge landforms.
- Activities: Ground based systems - The RHCA is composed of an inner zone (150 ft in width) where mechanized entry would not be allowed, and an outer zone where mechanized entry would be limited. Forest fuels can be removed from the inner zone by mechanized grapples, end-lining, or hand thinning. In the outer zone, feller-buncher type machinery could be used, but there would be no construction of new landings or skid trails. Existing skid trails and landings may be used in the outer zone by approval. Cable systems - Cable yarding would occur within RHCAs only where full suspension could be achieved.
- Broadcast burning would be allowed within RHCAs, but there would be no ignitions in the inner zone (fire may back through this zone). Where fuel concentrations exceed 5 tons/acre (0-12 inch size class) following treatment, hand piling of slash may be required. All hand piles would be located a minimum of 50 feet from the edge of channel.
- Silvicultural Prescription: The appropriate DFPZ or area thinning prescription would be applied in the outer zone. Within the inner zone, removal of large material would be minimal due to limitations on equipment entry. Exceptions to this general prescription would be made in the DFPZ units located within T.26N., R.6E., Section 19 (southern half) and T.26N., R.5E., southwest ¼ Section 11, to provide for wildlife connectivity. In these units, DFPZ and area thinning prescriptions would be modified to provide for 12-15 tons per acre of large down material (12' diameter or larger). Where forest fuels can be removed, the prescription for CWHR, 5M, 5D and 6 size stands would be applied (this design feature in italics would only apply to Alternative 1 since it is replaced by Prescription E for Alternative 14). This prescription is modified such that no trees with root mass in channel banks (or canopy above channel banks) would be removed. No riparian hardwood species (alder, willow, etc.) would be cut. No group selection harvest units would be placed within the RHCAs.

Soil Quality Standards and Best Management Practices

Soil Quality Standards (SNFPA, 2004), and appropriate Best Management Practices (BMPs) (Appendix E) that protect water quality and soils would be implemented for the entire project. BMPs are described in: Water Quality Management for Forest System Lands in California, Best Management Practices (USDA FS, 2000a) and SNFPA Record of Decision, 2004. These BMPs can be found in Appendix E. The following are some specific measures that would be implemented to protect soil and water resources.

- To minimize the potential for soil compaction in units where thinning activities are proposed within RHCAs and adjacent to meadows, equipment would not operate until soil conditions are sufficiently dry as to minimize compaction. In units outside of RHCAs, soil moisture conditions would be evaluated relative to conditions early and late in the year for determination of starting or ending equipment operations.
- All landings utilized during operations would be subsoiled. Subsoiling would lift and fracture the soil in place leaving it loose and friable to a minimum depth of 18 inches. Where temporary road and landing construction involves cut and fill, the feature would be subsoiled, then re-contoured to match the existing topography and slash scattered to provide ground cover and prevent re-entry. Slash would consist of organic material (logs, branches, and duff) and rocks/boulders. Slash would be scattered in such a manner as to resemble a natural appearance similar to the surrounding landscape. Following treatment, a minimum of 60 percent ground cover consisting of rocks and organic material would be maintained. These areas would be sufficiently blocked at the entrances to preclude motorized wheeled vehicles. Where temporary roads cross stream channels, all fill would be removed from the channel and utilized for re-contouring or spread in a stable location outside the RHCA. Ground cover requirements as specified above would be 90 percent within RHCAs.
- To the extent possible, existing landings and skid trails would be utilized thus minimizing any new disturbance within the project area.
- Post treatment areas lacking suitable ground cover (such as skid trails, etc.) necessary to preclude sediment delivery to surface water would be slashed/mulched with native material so that a minimum of 60 percent ground cover is maintained.

Silviculture

Cut stumps 14 inches diameter and greater of live true fir and pine trees would be treated with an EPA registered borate compound (Sporax), which is registered in California for the prevention of annosus root disease.

- Sporax would not be applied within 25 feet of standing or running water.
- Sporax would not be applied in flag and avoid areas to protect threatened, endangered or sensitive plants.
- Sporax would not be applied during precipitation events.
- Sporax would be applied to conifer stumps within one hour of creation.

Aspen stands where they occur within DFPZ and area thinning treatments would be protected. Ladder and canopy fuels would be thinned away from aspen. Aspen would be retained while minimizing impacts to the clones as much as practicable. Broadcast or pile burning would not occur within aspen clones. Group selection harvest units would not be placed within aspen clones.

All white pine that are identified as rust resistant would be protected while minimizing impacts to identified rust resistant candidate trees as much as practicable. Healthy white pines that show no observable signs of blister rust would be favorably retained.

Healthy shade intolerant species would be favorably retained over shade tolerant species in mixed conifer stands. Shade intolerant species include ponderosa pine, Jeffrey pine, sugar pine, and Douglas-fir. Components of all species occurring within DFPZ and area thinning units would be retained.

Wildlife

The following Limited Operation Periods (LOP) would be implemented within ¼ mile of known nest sites: California spotted owls, March 1 - August 31; Northern goshawks, February 15 - September 15. In unsurveyed Northern goshawk habitat, LOPs would be implemented until surveys have been completed.

If new active goshawk nest sites are found within the project area:

- Protect the nest tree with a 125-foot no treatment buffer.
- Adjust the marking prescription within the newly defined territory to meet habitat goals to attain suitable nesting habitat within 2 decades by maintaining a minimum of 40% to 50% canopy cover and heterogeneity.

Areas that have been identified as important linkages to maintain habitat connectivity for late successional species, predominantly forest carnivores, would be thinned using the Perennial Fish Bearing Streams prescription for RHCAs.(this design feature would only apply to Alternative 1 since it is replaced by Prescription E for Alternative 14)

Snag Retention Guidelines

The following are the Design Features developed to maintain sufficient wildlife trees within the Creeks Forest Health Project area. Current snag data indicates that in most areas snags are below the recommended numbers and do not meet the Forest LRMP (1993 LNF LRMP, Appendix O) retention guides of 2:1 or 3:1 hard: soft snag ratio. These snag guidelines can be found in Appendix D. As a means to increase the number of hard snags and meet the intent of the snag recommendations within the SNFPA ROD (2004), the following would be incorporated into the project layout:

- To facilitate the recruitment of wildlife trees, silvicultural marking prescriptions would allow for the retention of trees that are likely to die in the near future or are developing attributes (hollow boles, mistletoe brooms, flaking bark) that favor wildlife (Stage 1 and Stage 2).
- Following the marking guidelines developed for this project, designate only Stage 1 and 2 as wildlife trees within the DFPZ except that no wildlife trees would be retained within 150 feet (one tree length) of any road (including temporary roads or landing locations).
- Within Area Thinning, retain wildlife trees within Stages 1, 2, and 3.
- Use an interdisciplinary process during layout, placing unit boundaries to exclude pockets of suitable wildlife trees to avoid conflict (i.e. safety issues) with vegetation management activities.
- There would be no removal of "salvage trees" outside of a unit boundary in this project except as needed to meet safety concerns along roads and other areas of sale related activity.

- Any wildlife trees designated within the project unit that is removed during operations must be replaced with one of similar wildlife value. This may be outside the unit but must be in the general vicinity. Use the Snag Retention Guidelines to prioritize the selection of replacement trees.
- Implementation monitoring would occur to ensure that these design features are successful in retaining wildlife habitat attributes.

The following are recommended methods for addressing hazards in the field and would be incorporated into the Sale Administration program.

- If a tree is determined to be a hazard but is otherwise sound (Decay Class 1 or 2) and greater than 20 inches dbh, consider topping the tree (with a TIMCO or other equipment) no lower than 10 feet and as high as feasible.
- Where areas are deficient in wildlife trees, damaged trees (that are species rated as the "highest priority for retention" in the project Snag Marking Guidelines) that would otherwise be removed would be retained.
- Wildlife trees would be retained away from temporary roads, main skid trails, and landings (hub areas) to meet safety concerns.
- Where data exists, wildlife tree data (average number of wildlife trees/acre) would be indicated on the green cards for use by the Sale Administration Team.

Generally retain an average of 10-15 tons of large down wood per acre across treatment units. This material would consist of logs greater than 12 inches in size at the small end and a minimum of 6 feet in length.

Botany

TES and Special Interest Plants

All occurrences of *Botrychium ascendens* (upswept moonwort), *Botrychium crenulatum* (scalloped moonwort), *Botrychium minganense* (Mingan moonwort), *Botrychium montanum* (western goblin), *Botrychium pinnatum* (northwestern moonwort), and *Botrychium simplex* (Yosemite moonwort) would be protected through flag and avoid methods and displayed on contract maps. Hydrologic conditions in riparian areas would be maintained where these plants occur by allowing no machinery in occupied habitat. If a riparian area with *Botrychium* occurrences has excessive encroaching conifers and/or excessive fuels leading to a decline in riparian conditions, smaller diameter trees would be thinned and excess fuels would be removed by hand only.

All occurrences of *Meesia triquetra* (meesia moss) and *Drosera anglica* (English sundew) and their associated meadows would be protected from project activities through flag and avoid methods. All fens and associated meadow locations would be displayed on contract maps.

All occurrences of *Silene occidentalis ssp. longistipitata* (long-stiped campion) would be protected through flag and avoid methods and plant location would be displayed on contract maps.

New occurrences of Threatened, Endangered or Sensitive (TES) plant species discovered before or during ground-disturbing activities would be protected through flag and avoid methods.

Wet Meadows (Fens)

The RHCA would extend 150 feet from the edge of the fen. Live vegetation and snags would not be removed from within the RHCA zones around fens. Hand and/or machine grapple piles would be placed outside of the RHCAs around fens.

Noxious Weeds

All off-road equipment would be inspected and certified as weed free prior to entering the project area. If new occurrences of noxious weeds were identified during treatment implementation, equipment used would be washed after leaving an infested area and before entering a non-infested area. Staging of equipment would be done in weed free areas.

Known noxious weed infestations would be identified, flagged where possible, and mapped for this project. Identified noxious weed sites within or adjacent to the project area containing isolated patches with small plant numbers would be hand pulled or dug prior to project implementation. This includes all known Canada thistle occurrences along Butt Creek within the project area. Any larger or unpullable infestations would be avoided by harvesting equipment to prevent spreading weeds within the project.

New small infestations identified during project implementation would be evaluated and treated according to the species present and project constraints. If larger infestations were identified after implementation, they would be isolated and avoided with equipment.

Post project monitoring for implementation and effectiveness of weed treatments and control of new infestations would be conducted as soon as possible, and for a two-year period after completion of the project.

If project implementation calls for mulches or fill, they would be certified weed free.

Heritage Resources

All historic properties eligible or potentially eligible for listing on the National Register of Historic Places (i.e., Class I and Class II properties) within areas of DFPZ construction, area thinning, and group selection harvest or other project related activities would be protected by flagging site boundaries as non-entry zones for project activities (flag and avoid). No activities would occur within site boundaries.

Linear sites such as historic roads, ditches, and prehistoric quarries etc. could be crossed on a limited basis in areas previously disturbed. All crossings would be made perpendicular to the site and the site would be returned to its original design at project completion. All crossings would be designated.

Hauling on Forest system roads that bisect heritage sites would continue. Maintenance, reconstruction, or decommissioning of these roads would not take place within site boundaries. Vehicles and/or equipment using these roads would remain on the road prism while traversing through a heritage site; exiting the road prism while within site boundaries would not occur.

Temporary roads would not be located on or bisect heritage sites. Sites crossed by existing non-system roads could be evaluated for significance (National Register eligibility) to determine if protection or further management is necessary. Archaeological sites within treatment areas or on roads would be monitored during and after project completion.

If heritage resources are encountered during project activities, all work would immediately stop in the vicinity of the find until an assessment of the situation is made.

Special Uses / Recreation

No project activities would occur within posted campground boundaries, and all facilities would be protected. Operations created slash would be 100% cleanup, piled and burned or removed, within 200 feet of developed campground boundaries. All activities adjacent to developed facilities would be signed and

controlled to alert the public of potential hazards. Roads accessing campground, trailheads, and trails would be kept open and free of debris.

A limit operating period from December 26th through April 1st would be placed on groomed snowmobile trails (FS Roads 27N04, 27N65, 26N02 and 26N35).

Cut tree marking would be applied within 150 feet of the Soda Creek Trail. The trail tread would be protected. Operations created slash would be 100% cleaned up, piled and burned or removed, within 100 feet of the Soda Creek Trail. Cut tree marking would be applied within 150 feet of Pacific Crest National Scenic Trail (PCT). Operations created slash would be 100% cleaned up within 100 feet of the PCT. Equipment crossing of the PCT would be limited and would be designated. Trail tread would be restored at the crossings.

Range

Fences, water developments, and cattle guards would be protected. Repair of damage to range improvements due to project activities would be the responsibility of the contractor.
Range study areas and transects would be protected. Slash would be piled outside study area locations.

Safety

During project implementation, the public would be alerted to potential hazards through signing along Forest system roads. Road 27N65 may be subject to periodic closures for project implementation, and temporary closures of all roads may occur for safety reasons. Safety provisions would be included in project contracts.

Alternatives Considered but Eliminated from Detailed Study

Public comments received in response to the Proposed Action provided suggestions for alternative methods of achieving the purpose and need. Some of these alternatives may have been outside the scope of the project intent, duplicative of the alternatives considered in detail, or determined to be components that would cause unnecessary environmental harm. Therefore, a number of alternatives were considered, but dismissed from detailed consideration for reasons summarized below.

Alternative 3 – Implement the project using 2001 SNFPA ROD direction

The 2004 SNFPA ROD has superceded the 2001 SNFPA ROD. The 2001 SNFPA ROD no longer provides Forest Plan direction. This alternative would not be consistent with the 1993 Lassen LRMP, as amended, by the 2004 SNFPA ROD. Therefore, this alternative was not considered in detail.

Alternative 4 – Retain mid-large trees and canopy closure. Treat only surface and ladder fuels.

This alternative closely resembles the Alternative 1 for construction of DFPZs and area thinning under Prescriptions A (DFPZ) and F (Area Thin) that are designed to treat surface fuels and ladder fuels, and small trees generally up to 12 inches dbh, to reduce fuel continuity. Occasional midstory trees up to 20 inches dbh may be treated to break up fuel continuity and favorably retain adjacent smaller healthy trees. However, this alternative does not meet Purpose and Need statements 1 through 3. These Purpose and Need Statements describe the difference between the desired conditions found in our current direction from the 2004 SNFPA

ROD, the 1999 HFQLG ROD, and the 1993 Lassen LRMP and the existing condition on the ground. There is a need to reduce fuel continuity and overall stocking density in the surface, ladder and canopy fuels (Figures 3-10 and 3-11). By only treating the surface and ladder fuels, our purpose and need to achieve a desired condition within the forest canopy, would not be met.

This alternative also does not meet Purpose and Need statements 4 and 5 for Group Selection. Groups would generally be located within size class 3 stands (Region 5 size class). Size class 3 stands (CWHR 4) have diameters ranging from 12 to 24 inches dbh, but occasionally include larger trees. Live trees larger than 30 inches dbh would be retained except as necessary for operability. Due to all these reasons, this alternative was not considered in detail.

Alternative 5 – Retain all trees greater than 12 inches diameter in RHCAs.

Purpose and need statements 2 and 3 describe the need to reduce the fuels and fire hazard for forested stands, including those in the RHCAs. Fuel reduction treatments are needed within RHCAs in order to meet the Riparian Management Objectives (Chapter 3, Watershed / Fisheries / Soils section) for the project area. Treatments within the project area are needed to 1) maintain or restore riparian vegetation to provide large woody debris; 2) thin conifers to allow tree growth and increase the potential for delivery of larger trees to aquatic habitats; 3) maintain or restore the diversity and productivity of native and desired non-native plant communities in the riparian zone; 4) maintain or restore habitat to support populations of well-distributed native and desired non-native plant, vertebrate, and invertebrate populations; 5) to reduce the effects of wildfires within the riparian communities and 6) treatments would move the riparian community toward a more historic composition, providing the opportunity for native flora and fauna to trend towards a more natural condition. Without treatments within the RHCAs to meet the Riparian Management Objectives, Purpose and Needs statements 2 and 3 would not be met. Due to these reasons, this alternative was not considered in detail.

Alternative 6 – No group selection units within ¼ mile of the Pacific Crest Trail (PCT) or the Peacock Point Trail. Implement a 250-foot no treatment zone along the Pacific Crest Trail.

This alternative was dropped at the request of the developer. A field review was conducted after the submittal of their comments on the DEIS. Both action Alternatives adequately address the view of concerns.

Alternative 7 – No activities in marten habitat, no removal of trees > 30 inches for operability, and limit the reduction of canopy closure and basal area.

Recent survey data indicates that marten are well distributed throughout the Lassen National Forest, particularly on the Almanor District. Given the number of sightings over the years, it is likely that marten occur at various levels throughout the project area. Canopy closure and basal area reduction activities under the Proposed Action are planned in marten habitat since it occupies a great deal of the project area. By not allowing construction of DFPZ, area thinning or group selection activities within marten habitat, Purpose and Need statements 1 through 5 would not be met. If no DFPZ treatments occurred in marten habitat, those DFPZ areas would be fragmented and would not create a network that is effective in reducing the potential size of

wildfires nor proved a safe location for fire suppression personnel to take action in the event of a wildfire. Figure 3-16 shows the areas of marten habitat that would be impacted by the action alternatives. This figure also shows the fragmentation to the DFPZs that would occur.

In addition, a significant issue, as well as Alternative 14, was created between Draft and Final EIS to address the marten issue. The objective of Alternative 14is to maintain existing suitable spotted owl and marten foraging habitat in key areas that are predominately CWHR 4M and 4D. Ten percent of the treatment unit would consist of non-treatment leave islands which would emphasize maintaining small diameter tree canopies. Post treatment canopy closure of trees greater than 6 inch dbh would average 40 to 45 percent canopy closure immediately after treatment.

Trees greater than 30 inches diameter would only be removed for operability. This is OSHA requirement for logging operations and is consistent with page 68 of the 2004 SNFPA ROD. Without the ability to have a safe working environment, the Purpose and Need statements 1-5 would not be met.

The Proposed Action and Alternative 14 do limit the canopy closure and basal area reductions to only those that are needed to meet the purpose and need for the reduction of fuels and fire hazard within the project area. To reduce either the canopy closure or basal area any further would compromise the effectiveness of the DFPZs. Due to these reasons, this alternative was not considered in detail.

Alternative 8 – Decommission more roads.

A Roads Analysis Project (RAP), hereby incorporated by reference, was completed for this project. The RAP included recommendations for road decommissioning, replacement of road culverts, work on roads at stream crossings, etc. Some of the roads that were recommended for decommissioning are connected actions and are included as part of both action alternatives. Although other roads are being considered for decommissioning, they were not considered connected actions and were therefore not brought forward in this NEPA analysis. Additional road decommissioning, under separate NEPA analysis, may occur in the future if resource management goals require that action. Therefore, this alternative was not considered in detail.

Alternative 9 – Use group selection treatments instead of DFPZ treatments in roadless areas and in furbearer management areas.

There are no RARE II inventoried roadless areas that occur within the project boundary therefore no treatments are being proposed in them. Furbearer Management Areas were developed under the 1993 Lassen LRMP and are no longer an applicable land allocation as the 2004 SNFPA ROD changed management direction for this species.

In addition, the DFPZ treatments and locations are planned per management direction under the 1999 HFQLG ROD and the 2004 SNFPA ROD. If group selection treatments were solely proposed within the locations that require DFPZ treatments, Purpose and Need statements 1 and 2 would not be met. Due to these reasons, this alternative was not considered in detail.

Alternative 10 – Limit the reduction of canopy closure and basal area in Goshawk nesting and foraging areas.

Goshawk nesting habitat is comprised of CWHR 4M, 4D, 5M, and 5D. Goshawk Protected Activity Centers (PACs) are composed primarily of approximately 200 acres of suitable nesting habitat. Ten northern goshawk

PACs are located within the project area and no treatment is proposed within them. Two of these PACs were identified between the Draft and Final EIS.

Foraging habitat also exists within the project area. The Proposed Action does limit the canopy closure and basal area reductions to only those that are needed to meet the purpose and need for the reduction of fuels and fire hazard within the project area. By not allowing construction of DFPZ, area thinning or group selection activities within goshawk foraging habitat, Purpose and Need statements 1 through 5 would not be met. Due to these reasons, this alternative was not considered in detail.

Alternative 11 – Treat activity fuels using other methods such as chipping and mulching.

This alternative is proposed to reduce the amount of fuels that would need to be burned in order to reduce smoke effects to adjacent areas and people. Treatments using mastication, chipping, and removing treated fuels are included in the proposed action for this project and would be used where economically feasible to meet Purpose and Need statements 1 through 5. Chipping and mulching alone would not reduce fuels to desired levels. More importantly, paying someone to chip the material, including the sawlogs, would be costly and an inefficient way to meet Purpose and Need. There would be a public benefit from a contactor paying us to remove the forest products, from those products being used to meet our demand for wood.

Hand and machine piling, and the subsequent burning of piles, is required to reduce fuel loadings. Burning would occur with an approved burn plan and smoke would be monitored to reduce impacts to adjacent areas and people.

By not allowing prescribed burning to some degree to occur and solely rely on chipping and mulching to construct the DFPZs and area thinning activities, Purpose and Need statements 1 through 5 would not be met. Therefore, this alternative was not considered in detail.

Alternative 12 - Introduce native forbs and grasses to help prevent the occurrence and spread of noxious weeds.

Observations of sites that have been disturbed during timber harvest activities on the Lassen National Forest suggests that most sites retain an extensive network of native plant roots and rhizomes that resprout once adequate moisture is available. The Noxious Weed Risk Assessment (Appendix B) completed for this project shows that through the implementation of Integrated Design Features in the Proposed Action, potential risk factors for noxious spread and invasion would be greatly reduced. Based on the Risk Assessment, native seed planting is not needed. As such, if we were to include planting as an activity, costs to the project would be increased and the proposed action is intended to implement economically efficient treatments to reduce hazardous fuels. Therefore, this alternative would not meet Purpose and Need statement 5 and was not considered in detail.

Alternative 13 – Increasing fire resilient pine.

This alternative is proposed to a) no removal of ponderosa or sugar pine sawtimber (except clearly diseased and dying, or dead trees in excess of large snag retention); b) no group selection units on slopes where the forest is unlikely to regenerate pine, such as north-facing slopes, and slopes above 5,500 feet in elevation generally (and south-facing slopes above 6,000 feet); c) require whole-tree yarding for all trees in all units, both DFPZ and group selection; d) no removal of trees over 20" dbh outside of any Defense Zone units; and e)

piling and burning of slash debris WITHIN the group selection and DFPZ units would be required during the first fall or spring following completion of logging in any given unit (to be required of the timber sale contractor).

The silviculture prescriptions in Alternatives 1 and 14 already favor the reduction of healthy and disease free ponderosa and sugar pine trees over non-fire resilient trees like white fir. Whole tree removal for DFPZs, group selection, and area thins is one of the primary methods of treating crown and ladder fuels. When whole tree removal is not practical or economical, post harvest treatments such as hand felling and piling, tractor piling, and chipping would utilize ground based mechanical equipment (shears, skidders, etc) that would use whole tree removal harvest methods for trees down to three inch dbh. Most proposed DFPZs and area thinning prescriptions would utilize a "thinning from below" treatment where the healthiest, largest trees are retained. This tends to concentrate harvesting trees in the smaller dbh groups (Figures 3-4 through 3-7) most trees removed would tend to be less than 20 inches dbh. Most post harvest fuel treatments and site preparation are planned to occur the first field season after harvest operations. Reforestation of the group selections is planned to be accomplished within five years of harvesting. Since the effects from this alternative would be similar to that of Alternatives 1 and 14 this alternative was not considered in detail.

Comparison of Alternatives

This section provides a summary of the how the three alternatives analyzed in detail meet purpose and need, address the significant issue and key resource effects. All other resource effects can be found in Chapter 3.

Meeting Purpose and Need

Alternatives 1 and 14 would implement the Herger-Feinstein Quincy Library Group Forest Recovery Act (1998 HFQLG Act) (USDA FS, 1999a), which requires the construction of a network of DFPZs, that would be effective in reducing the potential size of wildfires, and providing fire suppression personnel safe locations for taking actions in the event of a wildfire. These action alternatives also implement individual tree selection (area thinning) to promote forest health and provide an uneven-aged structure to forested stands. The group selection would achieve an all-aged mosaic of timber stands, while contributing to the local economy through a sustainable output of forest products. This alternative would generate jobs and income generated from the forest products industry, and energy from local cogeneration plants. For Alternative 1, the Present Value Costs is $7,940,143, while the Present Value Revenue is $9,165,953, giving a Present Net Value of $1,275,810. Alternative 1 would implement economically efficient treatments to reduce hazardous fuels and to contribute to community stability with a Benefit-Cost Ratio for Alternative 1 is 1.15. For Alternative 14, the Present Value Costs is $7,858,281, while the Present Value Revenue is $8,901,801, giving a Present Net Value of $1,043,520. Alternative 14 would implement economically efficient treatments to reduce hazardous fuels and to contribute to community stability with a Benefit-Cost Ratio for Alternative 14 is 1.13. And finally, these alternatives would provide the necessary access for the construction of the DFPZs, group selection timber harvest, and area thinning, and to reduce impacts of the transportation system.

For Alternative 2 no action produces no economic outputs. This alternative would provide no additional public benefits to local jobs or income generated from the forest products industry. the Present Value Costs is $678,275, while the Present Value Revenue is $0, giving a Present Net Value of -$678,275. The Benefit-Cost

Ratio for Alternative 2 is 0.00. The transportation system and unclassified roads would remain in their present condition.

Addressing the Significant Issue

Alternative 14 was developed to address the significant issue. This alterative would maintain habitat connectivity between areas of suitable habitat for the California spotted owl and American marten whereas Alternative 1 would to a lesser degree. For a quick comparison, this information is also given in Table 2-6 showing the CWHR changes.

Environmental Effects on Key Resources

Tables S-3 and S-4 summarizes the key resource environmental effects of Alternative 1 (Proposed Action), Alternative 2 (No Action), and Alternative 14. Detailed discussions of environmental affects for all resources analyzed can be found in Chapter 3 of the FEIS.

Table 2-5. Summary of Effects to Key Resources

	Alternative 1 – Proposed Action	Alternative 2 – No Action	Alternative 14
Silviculture Resources			
Changes in CWHR Class	Refer to Table S-4 below	Refer to Table S-4 below	Refer to Table S-4 below
Fire / Fuels			
Condition Class	Moves treatment units toward Condition Class 1.	Condition Classes 2 and 3.	Moves treatment units toward Condition Class 1.
Fire Hazard	Reduces hazardous wildland fire behavior from fires both originating within treatments and from outside point sources.	Moderate to high.	Reduces hazardous wildland fire behavior from fires both originating within treatments and from outside point sources.
Fire Risk	High	High	High
Wildlife			
Decadence	General reduction in the number of snags within the areas treated, however, project would not substantially affect current snag levels within the treated areas and snag numbers would continue to increase within the project area due to natural recruitment.	No change from current conditions. Overall snag numbers are likely to increase over time due to natural recruitment.	Same Alternative 1, except minor increase in areas that would retain snags and large down wood.
Determinations – TES terrestrial wildlife species			
Federally listed species or their designated critical habitat	Preliminary determinations from DEIS - No affect - Northern Bald Eagle, Northern Spotted Owl, and the Valley Elderberry Longhorn Beetle.	No affect to these species.	No affect - Northern Bald Eagle, Northern Spotted Owl, and the Valley Elderberry Longhorn Beetle.
Determinations - Forest Service sensitive species			
Forest Service	Preliminary determinations from DEIS - No affect - Great Grey Owl,	No affect to these species.	No affect - Great Grey Owl, Greater Sandhill Crane,

	Alternative 1 – Proposed Action	Alternative 2 – No Action	Alternative 14
sensitive species	Greater Sandhill Crane, Swainson's Hawk, Greater Sage Grouse, California Wolverine, Sierra Nevada Red Fox, Pacific Fisher, Townsend's Big-Eared Bat, Western Red Bat, and Northwestern Pond Turtle. May affect individuals, but is not likely to cause a trend towards federal - California Spotted Owl, Northern Goshawk, Willow Flycatcher, American Marten, and Pallid Bat.		Swainson's Hawk, Greater Sage Grouse, California Wolverine, Sierra Nevada Red Fox, Pacific Fisher, Townsend's Big-Eared Bat, Western Red Bat, and Northwestern Pond Turtle. May affect individuals, but is not likely to cause a trend towards federal - California Spotted Owl, Northern Goshawk, Willow Flycatcher, American Marten, and Pallid Bat.
Management Indicator Species			
Mule deer	Project would have no measurable effect on population trends.	Alternative would further reduce deer habitat within the project area and cumulatively within the Forest.	Same Alternative 1.
Black bear	Project risk to the species is considered very low and population trends would not be affected.	Alternative would have no measurable affects on this species, as no changes to habitat attributes would occur.	Same Alternative 1.
Hairy woodpecker	Population trends would remain unaffected by the project.	Alternative increases number of snags and increases ratio of hard to soft snags, which relates to forage habitat.	Same Alternative 1.
Pileated Woodpecker	Project would have little impact on the amount of moderate and high quality habitat; no effect to species or population trends.	Alternative would maintain current status and distribution of habitat and over time habitat would improve due to increases in larger snags and tree sizes.	Same Alternative 1, except with the addition of Prescription E, may see improved localized use of areas due to retention of pockets with higher densities.
Peregrine Falcon	Project would not affect the nesting habitat. Limited operating periods would limit disturbance during nesting. Project may have limited impacts to prey species.	Alternative would continue the trend of declining forage habitat due to increased stand densities. Alternative would have no effect on the existing nesting habitat.	Same Alternative 1.
Migratory Landbirds	Project is not likely to have a measurable long-term affect on migratory bird species, however, it is likely local populations would initially decline within the treatment area.	Alternative would continue the trend of denser canopied stands with a decline in understory vegetation that is preferred by most species.	Same Alternative 1, except for limited localized improvement for species that prefer denser stands for nesting.
Watershed / Fishery Resources			
Watershed and Aquatic Resources			
Sediment	Forest harvest and thinning activities are not expected to measurably increase delivery of sediment to stream channels. A long-term decrease in road surface	Sediment production from project area watersheds would remain in its present condition, or lacking adequate road maintenance, may slightly increase.	Slightly lower risk of erosion and sediment delivery from harvest activities than Alternative 1, but difference is small.

	Alternative 1 – Proposed Action	Alternative 2 – No Action	Alternative 14
	sediment production is expected as a result of the proposed action. In the short term, the time during which roads are used for haul, it is expected sediment reductions from road surface and road surface treatments at stream crossings would be balanced by increases due to road maintenance.		
Determinations – Forest Service Sensitive Species			
Forest Service sensitive species	Preliminary determinations from DEIS - There are no known populations of either Cascades frog or MYLF in the project area. The project may affect individuals but is not likely to result in a trend toward Federal listing or loss of viability for the Cascades frog or the mountain yellow-legged frog.	No affect to Cascades frog or the mountain yellow-legged frog. As no action would preclude any activities, there would be no short term direct or indirect effects to sensitive aquatic species, or their habitat.	There are no known populations of either Cascades frog or MYLF in the project area. The project may affect individuals but is not likely to result in a trend toward Federal listing or loss of viability for the Cascades frog or the mountain yellow-legged frog.
Management Indicator Species			
Rainbow Trout	There is a low risk that the alternative would contribute toward adverse effects to rainbow trout.	As no action would preclude any activities, there would be no short term direct or indirect effects to management indicator aquatic species, or their habitat. In the long term, sediment conditions would remain unchanged, rather than be improved, so habitat for MIS rainbow trout would remain unchanged.	Same Alternative 1
Cumulative Watershed Effects			
Sub Watershed and Threshold of Concern (TOC) in Percent ERA			
Fanani	4	4	4
Grizzly Creek	14	10	14
Humbug Valley	6	4	6
Lemm Hollows	13	9	13
Marian Creek	3	3	3
Ruffa	5	3	5
Shanghai Creek	5	2	5
Soda Creek	5	4	4
Soldier Creek	3	3	3
Upper Yellow Creek	12	9	12

Table 2-6. Changes in Project Area CWHR classes between Alternative 1, Alternative 2 and Alternative 14.

Alternative 2, No Action

Forest Cover Type	CWHR Class - Acres in Project Area, Pre Treatment																
	Seed-ling	Sapling (1" - 5.9" dbh)				Pole (6" - 10.9" dbh)				Small (11" - 23.9" dbh)				Medium/Large (> 24" dbh)			
	1	2S	2P	2M	2D	3S	3P	3M	3D	4S	4P	4M	4D	5S	5P	5M	5D
Aspen	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0
Lodgepole pine	0	0	0	0	0	0	29	37	0	0	0	0	0	0	0	0	0
Mixed conifer	59	131	0	8	0	340	492	303	19	181	1,854	6,437	2,728	9	203	1,249	60
Ponderosa pine	0	29	43	0	4	0	159	39	102	11	8	0	0	0	0	0	0
Red fir	0	218	112	0	0	106	171	189	281	186	429	1,758	1,228	29	77	25	92
White fir	0	373	17	18	0	1,158	599	169	116	358	2,282	2,844	1,067	22	159	185	20
Total acres	59	751	172	26	4	1,604	1,450	737	518	736	4,591	11,039	5,023	60	439	1,459	172

Change between Alternative 2, No Action and Alternative 1, Proposed Action

Forest Cover Type	CWHR Class - Acres in Project Area, Post Treatment																
	Seedling	Sapling (1" - 5.9" dbh)				Pole (6" - 10.9" dbh)				Small (11" - 23.9" dbh)				Medium/Large (> 24" dbh)			
	1	2S	2P	2M	2D	3S	3P	3M	3D	4S	4P	4M	4D	5S	5P	5M	5D
Aspen	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0
Lodgepole pine	0	0	0	0	0	0	29	37	0	0	0	0	0	0	0	0	0
Mixed conifer	867	131	0	8	0	340	497	236	19	178	2,867	5,138	2,098	9	198	1,428	59
Ponderosa pine	1	29	32	0	0	0	173	21	54	11	46	28	0	0	0	0	0
Red fir	110	218	112	0	0	106	171	122	206	186	838	1,509	1,051	29	77	74	92
White fir	326	368	17	8	0	1,156	598	147	110	347	2,572	2,330	976	22	159	231	20
Totals	1,304	746	161	16	0	1,602	1,468	563	389	722	6,341	9,005	4,125	60	434	1,733	171
Acre Changes	+1,245	-5	-11	-10	-4	-2	+18	-174	-129	-14	+1,750	-2,034	-898	NC	-5	+274	-1

Change between Alternative 2, No Action and Alternative 14

Forest Cover Type	CWHR Class - Acres in Project Area, Post Treatment																
	Seedling	Sapling (1" - 5.9" dbh)				Pole (6" - 10.9" dbh)				Small (11" - 23.9" dbh)				Medium/Large (> 24" dbh)			
	1	2S	2P	2M	2D	3S	3P	3M	3D	4S	4P	4M	4D	5S	5P	5M	5D
Aspen	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0
Lodgepole pine	0	0	0	0	0	0	29	37	0	0	0	0	0	0	0	0	0
Mixed conifer	834	131	0	8	0	340	497	245	19	178	2,707	5,322	2,098	9	198	1,429	59
Ponderosa pine	1	29	32	0	0	0	173	21	54	11	46	28	0	0	0	0	0
Red fir	107	218	112	0	0	106	171	124	206	186	807	1,541	1,052	29	77	74	92
White fir	303	368	17	8	0	1,156	599	147	110	347	2,572	2,346	978	22	159	233	20
Totals	1,245	746	161	16	0	1,602	1,469	574	389	722	6,150	9,237	4,128	60	434	1,735	171
Acre Changes	+1,186	-5	-11	-10	-4	-2	+19	-163	-129	-14	+1,559	-1,802	-895	NC	-5	+277	-1

Source: Almanor District GIS (Vestra_veg); S1 sparse cover, 10-24 percent canopy cover; P2 open cover, 25-39 percent canopy cover; M3 moderate cover, 40-59 percent canopy cover ;D4 dense cover, 60-100 percent canopy cover

Chapter 3. Affected Environment and Environmental Consequences

Introduction

This Chapter summarizes the physical, biological, social, and economic environments of the project area and the effects of implementing each alternative on that environment. It also presents the scientific and analytical basis for the comparison of alternatives presented in the alternatives chapter. This chapter is structured to show the effects to the silvicultural resources first, and then how each of the remaining resources uses the change in vegetation attributes to the individual resources that have vegetation needs.

Silvicultural Resources

This analysis is based on field reconnaissance of the project area in July 2004 and a variety of data sources including: aerial photography, Almanor District GIS files, and forest inventory data. Post treatment stand conditions are based on treatment modeling using the Forest Vegetation Simulator (FVS) (USDA FS, 2004c) program and project stand data.

The FVS program is a model for predicting forest stand dynamics. FVS projections used project area stand inventory data. The effects of the proposed treatments are based on FVS projections of stands with inventory data and are representative of average conditions. Stand conditions on the ground may vary from the conditions in sample stands.

Affected Environment

Project Area Covertypes

The project area forest and non-forest covertypes are displayed in Table 3-1. This table reflects acres of each vegetation type as well as private ownership identified for the entire project area. Subsequent tables such as Table 3-3 that display effects of treatments on vegetation do not display acres of the entire project area but only those acres of vegetation affected by treatment.

Stand Composition

Table 3-1 displays all of the vegetation cover types identified within the project area, however treatments are proposed only within forest conifer cover types and small inclusions of brush. Occasional small inclusions of non-forest areas such as rock outcrops also occur within treatment units and serve as naturally occurring fuel breaks. Treatments will occur within Riparian Habitat Conservation Areas (RHCAs) that are delineated around aquatic features such as intermittent and perennial streams and meadows. Treatments in these areas are designed to meet Riparian Management objectives and do not include the cutting of any riparian species. The mapped riparian vegetation areas have little to no conifer component in them and are not included for treatment. Aspen are considered a riparian species and no aspen stands are included for treatment. Aspen is known to occur within the project area outside of mapped pure aspen stands, predominantly in small groups or small areas of scattered individuals. In these instances, the aspen are generally overtopped by conifers and appear to be in decline. Pure lodgepole pine stands occur predominantly in cold moist drainages and areas with seasonally high water tables. No pure lodgepole pine stands fall within treatment units however lodgepole pine is also a minor component of mixed conifer and true fir stands at mid and upper elevations. Red fir stands

occur at the highest elevations within the project area and at slightly lower elevations (down to approximately 6000 feet elevation) on north slopes. Mixed conifer and ponderosa pine stands occupy south and west slopes at mid elevations (approximately 5000- 5500 feet elevation) and lower, drier sites. White fir stands occur at mid and upper elevations and intermingle with pine, mixed conifer and red fir.

Table 3-1. Project area forest and non-forest covertypes

Cover Type	Acres	%of NF Area
Forest		
Aspen	18	<1
Lodgepole pine	66	<1
Mixed Conifer	14,073	47
Ponderosa pine	395	1
Red fir	4,901	16
White fir	9,387	32
Subtotal Forest Cover Types	28,840	96
Non-Forest		
Brush	175	<1
Meadow	286	1
Riparian	213	1
Non-forest	248	1
Private	2,808	<1
Total Project Area	32,570	100

Source: Almanor Ranger District GIS (Vestra_veg)

Mixed conifer stands generally have large numbers of shade tolerant fir and incense-cedar in the understory and mid-story; and scattered, large diameter overstory pines. The species composition of forested stands will continue to shift toward shade tolerant species such as red fir, white fir, and incense-cedar with little or no disturbance. These species regenerate well in the understory (USDA FS, 2004a). Black oak occurs as a minor component of some mixed conifer stands in the project area, generally on south and west aspects at elevations below 5000 feet. The Proposed Action calls for retaining 25 square feet of basal area per acre of oaks 6 inches dbh or larger where they do not serve as ladder fuels. Further, surveys indicate there is very little oak in stands proposed for treatment and there is not the need to thin or remove them as ladder fuels.

Shade intolerant ponderosa pine, Jeffrey pine, sugar pine, and western white pine regenerate best on disturbed sites with exposed mineral soil and full sunlight. Natural disturbances that create large openings (generally one acre or larger) would promote the successful regeneration and growth of shade intolerant pine species (USDA FS 2004a).

Stand Structure and Density

The predominant California Wildlife Habitat Relationships (CWHR) size class of forest stands in the project area is 4, which equates to an average stand diameter (diameter at breast height or dbh) between 11-23.9 inches. Approximately 74% of the forest stands are in size class 4. Approximately 66% of forest stands have moderate to dense canopy cover ranging from 40% to 100% cover, which corresponds to CWHR canopy classes "M" and "D".

The CWHR canopy class "M" and "D" stands are approaching maximum stand density levels. Maximum stand density occurs when all site resources are being used by the stand, such that additional growth cannot occur without some tree mortality to free up resources, particularly water and growing space. Stand densities

are described by a Stand Density Index (SDI), which converts a stand's current density into a density at a constant reference size of 10 inches dbh. This allows for a direct comparison of density between stands and between various treatments. Other measures of stocking such as trees per acre or basal area (the cross sectional area of a tree bole measured at dbh) per acre can reflect varying densities depending on a stand's average dbh. For example, a basal area of 100 square feet per acre would indicate a low stand density if the average dbh were 24 inches, but would indicate a higher stand density if the average dbh were 8 inches.

Additionally, different tree species tolerate different maximum stand densities. Red fir can persist at higher densities and have a suggested maximum SDI of 1000, whereas mixed conifer have a suggested maximum SDI of 750. These are suggested maximum densities; however, these levels rarely occur in nature. At densities between 60% and 70% of maximum, tree growth and vigor is severely impacted by inter-tree competition. As stands exceed 60% of maximum SDI, they grow at increasingly slower rates as trees are stressed for resources. Individual tree mortality occurs throughout a stand at these densities often due to a combination of factors. Stands may persist at these levels for years; however, they are prone to large scale insect and disease outbreaks, and stand replacing fire because of their stressed condition and density (Ferrel, 1986). Drought events can exacerbate this condition and lead to widespread mortality as well.

Of the stands modeled, all CWHR canopy "D" stands were above 60% of maximum SDI and three quarters of them were above 70% of maximum SDI. The modeled CWHR canopy "M" stands averaged 58% of maximum SDI and nearly half the stands were at or above 60% of maximum SDI.

Table 3-2 shows the distribution of CWHR size and canopy classes of the forest cover types in the project area. Note that Table 3-2 lists all the forest cover types presented in Table 3-1 but does not include non-forest cover types. For consistency of tracking, Table 3-2 includes aspen and lodgepole pine forest cover types, however no treatments are proposed within these cover types.

Table 3-2: Project area CWHR classes (pre treatment)

Forest Cover Type	CWHR Class - Acres in Project Area, Pre Treatment																
	Seed-ling	Sapling (1" - 5.9" dbh)				Pole (6" - 10.9" dbh)				Small (11" - 23.9" dbh)				Medium/Large (> 24" dbh)			
	1	2S	2P	2M	2D	3S	3P	3M	3D	4S	4P	4M	4D	5S	5P	5M	5D
Aspen	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0
Lodgepole pine	0	0	0	0	0	0	29	37	0	0	0	0	0	0	0	0	0
Mixed conifer	59	131	0	8	0	340	492	303	19	181	1,854	6,437	2,728	9	203	1,249	60
Ponderosa pine	0	29	43	0	4	0	159	39	102	11	8	0	0	0	0	0	0
Red fir	0	218	112	0	0	106	171	189	281	186	429	1,758	1,228	29	77	25	92
White fir	0	373	17	18	0	1,158	599	169	116	358	2,282	2,844	1,067	22	159	185	20
Total acres	59	751	172	26	4	1,604	1,450	737	518	736	4,591	11,039	5,023	60	439	1,459	172

Source: Almanor District GIS (Vestra_veg)
S: sparse cover, 10-24 percent canopy cover
P: open cover, 25-39 percent canopy cover
M: moderate cover, 40-59 percent canopy cover
D: dense cover, 60-100 percent canopy cover

Desirable stand densities range between 35 - 50% of maximum SDI. These density levels represent fully stocked stands with available growing space and resources such that inter-tree competition does not largely affect stand growth. At these initial densities, inter-tree competition does not severely impact stand growth for a period of generally 20 years or more. Lower densities (nearer to 35% of maximum SDI) are desirable for younger stands because they grow more vigorously and individual trees can capitalize on available resources. Lower densities are also desirable to promote healthy regeneration, particularly openings for pine regeneration. Densities between 35 - 50% of maximum SDI and less represent fairly open grown, fully stocked stands with relatively sparse understory regeneration.

Forest Health

Dwarf mistletoe (*Arceuthobium spp.*) infection occurs throughout the project area and the most common dwarf mistletoe specie infects red and white fir. Most inventoried stands show light to moderate levels of infection. The average severity of infection of a tree is measured using a 6-point system. The live crown of a tree is divided into thirds and the numbers 0 (no infection), 1 (less than 50% infection), or 2 (50% infection or more) are assigned to each third of the tree, resulting in a maximum dwarf mistletoe rating (DMR) of 6. Moderately dense white fir and mixed conifer stands support the spread of mistletoe because susceptible host trees are in close proximity to one another. Dwarf mistletoe does not spread well in extremely dense stands however because host vigor and subsequent dwarf mistletoe seed production is low. Stands that are predominantly stocked with susceptible host trees (true fir) or have heavily infected trees in the overstory will develop increasing levels of infection. Mistletoe spreads from tree to tree and especially from overstory to understory trees. Dwarf mistletoe infection will spread through an even aged stand roughly two feet per year and more quickly when overstories are infected in multi-storied stands. With no treatment and continued wildfire suppression, levels of mistletoe infection would increase and mistletoe would spread. Infection by dwarf mistletoe causes mortality, reduced growth rates, loss of vigor, reduced cone and seed production, and increased susceptibility to other damage agents such as bark beetles (Filip et al., 2000). Severely infected trees (DMR of 5 to 6) can experience as much as a 40% growth loss.

Bark beetles are native pests that kill conifers. There are a number of bark beetle species present and active within the project area including: mountain pine beetle, western pine beetle, Jeffrey pine beetle, fir engraver beetle, and pine engraver beetle. Bark beetles are currently at endemic levels within the project area, causing occasional mortality that is usually associated with diseased, damaged, overmature, or stressed trees. Stands that grow increasingly dense increase in the risk of experiencing widespread mortality, generally from a complex of factors that includes a population outbreak of bark beetles. Typically, widespread bark beetle attacks occur in dense stands in conjunction with drought conditions when trees are already under stress. This combination provides a large potential food base of weakened trees. When bark beetles successfully infect a tree, they emit attractant chemicals that will attract other nearby bark beetles.

Annosus (*Heterobasidion annosum*) root disease is present in stands throughout the project area. The disease is normal in forest ecosystems and contributes to wood decay, decreased growth, tree mortality, and predisposition to bark beetle attack (Schmitt et al., 2000). Annosus root disease spreads from root to root contact of trees of the same species, and through aerial infection via fresh wounds in tree boles or freshly cut stumps.

Heart rot is common throughout stands, especially in older red and white fir trees. Rot also occurs in pines, incense-cedar, and Douglas-fir; however, these species are less susceptible. Fir trees are susceptible to brown and white rots caused by fungi. Fungi infect the trees through wounds caused by fire, frost cracks, lightning and mechanical damage. Thrifty, uninjured young fir trees are generally free form heart rot, but rot is common in overmature trees (Kimmey and Bynum, 1961).

Environmental Effects

Alternative 1 – Proposed Action

Direct Effects to Stand composition, Stand structure and Density

Direct Effects of DFPZ Treatments A, B, C and E

Within all DFPZ treatments, healthy fire-resilient dominant and co-dominant overstory trees would be retained. Overstory trees would be irregularly spaced to provide for crown fuel separation. Some trees in the mid story and understory would be retained where they are healthy well-growing trees that are isolated from serving as ladder fuels. Healthy trees of shade intolerant species (pine species and Douglas-fir) would be favorably retained; however, trees of all occurring species would be retained to maintain species diversity. Residual average canopy cover would range between 30% and 50%.

Prescribed burning would be conducted in DFPZ stands post-thinning to remove remaining surface fuels in excess of desired levels (5 tons/acre or less of down woody material less than 12 inches diameter). Prescribed burning poses a risk of damaging or killing residual trees. This risk is mitigated by concentrating fuels away from live trees, and by burning under weather conditions that promote low flame lengths and low burning intensities. Generally, mortality from 0% to 5% of stand basal area may occur as a result of prescribed burning. Mortality from prescribed burning would primarily occur in smaller understory trees that have thinner bark and crowns closer to ground level. This prescribed burning would not appreciably alter post-thinned stand structure.

Defensible fuel profile zone (DFPZ) treatment "A" (surface and ladder fuels) would treat 1,455 forested acres. This treatment applies to stands that are relatively open grown, but have undesirable surface fuels and ladder fuels (smaller trees) growing into overstory trees. There are also occasional undesirable pockets of dense trees. Generally, the size of cut trees would be within 12 inches dbh or less; however, occasional larger trees could be cut to break up pockets of fuel continuity or to selectively leave an adjacent similar-sized but smaller healthier tree. With the exception of younger stands such as plantations, overstory stand structure would not be appreciably altered by this treatment. This treatment area includes 14 acres of CWHR 5M class stands. These acres will remain as CWHR 5M class stands post-treatment.

DFPZ treatment "A" would generally remove an average between 10 – 20% of stand basal area. Most trees to be cut would be white fir in the understory. Residual stand densities would generally be between 35%-45% of maximum SDI. Average residual canopy cover would be near 40 percent except in stands with initial lower canopy cover. Approximately 75 percent of the treatments "A" stands have existing canopy cover less than 40%. Due to thinning the smaller diameter trees, average stand diameter would generally increase by over 4 inches. Treatment "A" includes approximately 670 acres of conifer plantations that would be thinned to 170 to 200 trees per acre, or about 15 to 16 feet of spacing between tree boles. The average stand diameter would not change greatly within plantations since most of the trees are of similar size.

DFPZ treatment "B" (surface, ladder and canopy fuels) would treat 4,055 forested acres. Stands treated under this prescription are moderately to quite dense and have large areas of continuous surface, ladder and canopy fuels. Most stands within treatment category "B" have an average SDI ranging from 65% to 79% of maximum. Inter-tree competition is reducing stand growth and vigor at these densities. Treatment "B" would remove an average between 20 – 40% of stand basal area stocking. Residual average stand basal area would generally range between 150 and 195 square feet. Post treatment stands would remain fully stocked, averaging 35%- 45% of maximum SDI. Average canopy cover would be reduced from over 60 percent to near 40 percent. Due to thinning the smaller diameter trees, stand average stand diameters would generally increase by about 4 inches. Treatment "B" would remove trees less than 30 inches dbh; however, most trees to be cut would be 20 inches dbh or less. Trees 30 inches dbh and greater would only be cut to facilitate operability (2004 SNFPA ROD).

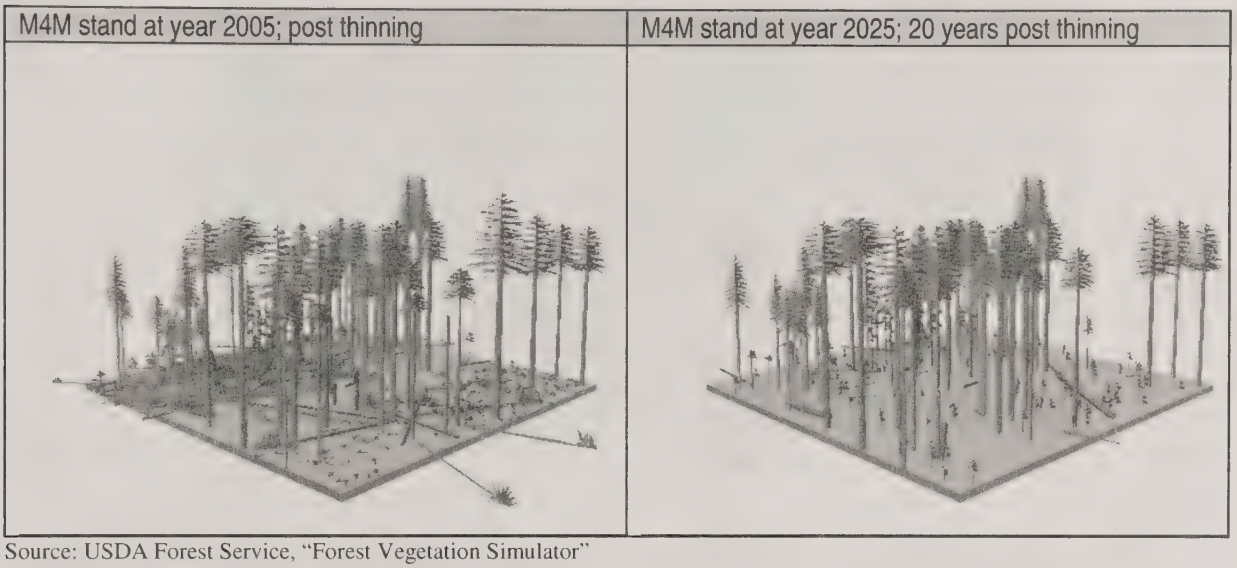
A representative stand was modeled in the Forest Vegetation Simulator model (FVS) to display and compare projected stand conditions with a DFPZ thinning treatment and with no treatment. The stand is a mixed conifer stand typed as a CWHR M4M with a basal area of 220 square feet per acre, an average stand diameter of 18 inches dbh and an average canopy cover of 40%. Stand diameter and canopy cover are measured from trees 6 inches dbh and above. Numerous small trees provide some additional understory canopy cover; however, these small trees are subsidiary and do not reflect the dominant stand structure. The stand is moderately infected with mistletoe; 92 trees per acre (approximately 20%) of white fir are infected with an average DMR of 2.1. These stand parameters are near those described as desirable for a DFPZ in the Proposed Action however the stand parameters don't reflect undesirable spacing of trees, such as smaller trees growing under or adjacent to overstory trees and serving as ladder fuels. Additionally, stand density is at 61% of maximum SDI, which is undesirably high. This stand is used as an example of stands that are identified for treatment. The projected results of proposed DFPZ thinning on this stand provide an example of conditions and results for stands at similar and higher densities and otherwise undesirable stand conditions.

The DFPZ treatment "B" was modeled using FVS with the representative M4M stand described above. After thinning, the stand averaged 180 square feet of basal area per acre and was at 37% of maximum SDI. Average stand diameter increased from 18 inches to 21 inches dbh. Residual canopy cover (measured from trees 6 inches dbh and larger) was 35%. Stand development at twenty years (year 2025) was also modeled in FVS however estimated growth rates were adjusted based on local stand growth data from within the project area. Twenty years after thinning, the treated stand averaged 260 feet of basal area per acre and was at 50% of maximum SDI. Canopy cover increased to 40% and the average stand diameter increased to 25 inches dbh. Some dwarf mistletoe remained in the stand overstory after thinning; however, much of it was removed. Twenty years after thinning approximately 37 white fir trees per acre (versus 280 trees per acre when not treated) were infected, with an average DMR of 3.4. Modeling results are displayed in Figure 3-1 below.

DFPZ treatment "C" (surface, ladder, and canopy fuel treatments in CWHR 5M, 5D, and 6 class stands) would treat 395 forested acres in accordance with the 2004 SNFPA ROD guidelines for DFPZ treatments in CWHR 5M stands and greater. Stands within treatment category "C" are densely stocked with an average SDI generally between 65% to 85% of maximum. Competition for resources at these densities causes reduced overall stand growth and vigor and individual tree mortality. Treatment "C" would remove an average between 10 – 25% of stand basal area stocking. Residual average stand basal area would generally range between 200

and 250 square feet. Residual stand density would average near 50% of maximum SDI. Average canopy cover would be reduced from over 60 % to near 40% and would not be reduced by more than a total of 30%. This treatment would remove trees less than 30 inches dbh however, most trees to be cut would be 20 inches dbh or less. Trees 30 inches dbh and greater would only be cut to facilitate operability (2004 SNFPA ROD). Most cut trees would be mid and understory trees; most of the overstory trees would be retained to maintain average canopy closure at or above 40%.

Figure 3-1. Stand conditions at year 2005 and 2025 after DFPZ treatment "B"



Source: USDA Forest Service, "Forest Vegetation Simulator"

Table 3-3 displays the predominant forest cover, and acres of each California Wildlife Habitat Relations (CWHR) class pre- and post DFPZ treatment. This table shows changes in stand structure and density as a result of DFPZ treatments. Most notable is the decrease of acres of CWHR density class M among the forest cover types and subsequent increases in acres of CWHR density class P. The changes reflect a decrease of canopy densities, particularly in CWHR density class M and D stands, and increases in stand average diameter (causing some stands to increase in CWHR size class) as a result of thinning from below. Changes in CWHR size and density classes as a result of treatments is further summarized in Table 3-6 for all treatments combined.

Understory vegetation growth is expected to be variable but generally slow in DFPZ units. Reduced canopy cover will allow more sunlight to the forest floor however the residual trees will continue to dominate site resources and tree roots will grow into newly available growing space. DFPZ maintenance is projected to occur between 5 to 30 years to treat understory vegetation growth and surface fuel accumulations, with most stands projected to need maintenance treatment at 10 years. Figures 3-2 and 3-3 depict stands that were thinned six years ago (in 1999) in the project area. These were thinnings from below to residual stand densities of 180 to 200 square feet of basal area, similar to proposed DFPZ treatments. Understory vegetation growth and surface fuel accumulations in these stands support projections of a DFPZ maintenance interval of ten years for this stand type.

Table 3-3. DFPZ treatments: acres within thinned stands before and after treatment.

Forest Cover	CWHR class	Pre Treatment Acres	Post Treatment Acres
Mixed Conifer	1S	14	14
	2S	20	20
	3M	20	2
	3P	219	219
	3S	97	97
	4D	262	0
	4M	1,376	448
	4P	669	1,825
	4S	61	61
	5M	381	433
	5P	25	25
Ponderosa Pine	2D	4	0
	2P	43	32
	2S	29	29
	3D	47	0
	3M	19	8
	3P	75	89
	4M	0	28
	4P	4	35
	4S	10	10
Red Fir	2S	16	16
	3D	62	0
	3M	65	12
	3S	9	9
	4D	76	0
	4M	407	177
	4P	15	421
	4S	14	14
	5M	1	16
	5P	1	1
White Fir	2M	1	0
	2S	67	67
	3P	188	189
	3S	254	254
	4D	46	0
	4M	451	133
	4P	525	880
	4S	184	184
	5M	25	34
	5P	12	12
Brush/other	x	111	111
Total		5,905	5,905

Source: Almanor Ranger District GIS (Vestra_veg; Creeks FVS output files).
Note: No change to Aspen or Lodgepole Pine

Figure 3-2 Stand thinned to approximately 200 square feet of basal area in 1999. Current canopy cover approximately 45%; vegetation coverage less than 10%.



Source: Almanor Ranger District Creeks Project FEIS planning record.

Figure 3-3 Stand thinned to approximately 180 square feet of basal area in 1999. Current canopy cover approximately 35%; vegetation coverage approximately 15%.



Source: Almanor Ranger District Creeks Project FEIS planning record.

Direct Effects of Area Thin Treatments F, G, and H

Within all Area Thin treatments, healthy fire-resilient dominant and co-dominant overstory trees would be retained. Overstory trees would be irregularly spaced to provide for crown fuel separation. Healthy well-growing trees in the mid story and understory would be retained with an emphasis of breaking up ladder fuels. Area thinnings would generally have a higher component of mid and understory trees than DFPZs, where healthy trees in these crown positions are pre-existing. Healthy trees of shade intolerant species (pine species and Douglas-fir) would be favorably retained; however, trees of all occurring species would be retained to maintain species diversity. Residual average canopy cover would range between 30% and 50%. Prescribed burning would be conducted in Area Thinned stands post-thinning to remove remaining surface fuels in excess of desired levels (5 tons/acre or less of down woody material less than 12 inches diameter). Prescribed burning poses a risk of damaging or killing residual trees. This risk is mitigated by concentrating fuels away from live trees, and by burning under weather conditions that promote low flame lengths and low burning intensities. Generally, mortality from 0% to 5% of stand basal area may occur as a result of prescribed burning. Mortality from prescribed burning would primarily occur in smaller understory trees that have thinner bark and crowns closer to ground level. This prescribed burning would not appreciably alter post-thinned stand structure.

Area thin treatment "F" (surface and ladder fuels) would treat 540 forested acres. This treatment applies to stands that are relatively open grown, but have undesirable surface fuels and ladder fuels (smaller trees generally less than 12 inches dbh) growing into overstory trees. There are also occasional undesirable pockets of dense trees. Most trees to be cut would be white fir in the understory, generally 12 inches DBH or less; however, occasional larger trees could be cut to break up pockets of fuel continuity or to selectively leave an adjacent similar-sized but smaller healthier tree. Treatment "F" includes 27 acres of CWHR 4M and 4D class stands. These will remain as CWHR 4M and 4D class stands post-treatment.

Treatment "F" would generally remove an average between 10 – 15% of stand basal area stocking. Residual average stand basal area in most stands would be below 175 square feet. Average residual canopy cover would be near 40 percent except in stands with initial lower canopy cover. Due to thinning predominantly smaller diameter trees, average stand diameters would increase by about 2 inches. Treatment "F" includes approximately 275 acres of conifer plantations where trees would be thinned to 170-200 trees per acre, or about 15 to 16 feet of spacing between tree boles. Average stand diameter would not increase greatly within plantations because most of the trees are similar sized.

Area thin treatment "G" (surface, ladder, and canopy fuels) would treat 765 forested acres. This treatment applies to stands that are generally patchy, alternating between relatively open areas and undesirably dense patches. There is undesirable fuel continuity between surface, ladder and canopy fuels in the dense patches that would be expected to burn severely under 90th percentile weather conditions, namely with flame lengths in excess of 4 feet and localized torching into overstory canopy.

Treatment "G" would remove an average between 10 – 20% of stand basal area stocking. Residual average stand basal area would generally range between 150 and 175 square feet, but would be lower in stands that have initially lower stocking. Average residual canopy cover would be near 40 percent except in stands with initial lower canopy cover. Predominantly, trees to be cut would be white fir in the understory and midstory. Occasional overstory trees would be cut to break up canopy fuels. This treatment would remove trees less than 30 inches dbh; however, most trees to be cut would be 20 inches dbh or less. Due to thinning predominantly

smaller diameter trees, average stand diameters would increase by about 3 inches. Trees 30 inches dbh and greater would only be cut to facilitate operability (2004 SNFPA ROD).

Most stands under treatment categories "F" and "G" are fairly young and have moderate stocking densities such that inter-tree competition is less pronounced as trees grow into canopy gaps. Thinning would break up dense clumps, remove undesirable ladder fuels, and favorably select for healthy, vigorous, shade intolerant pine. Post-treatment stands would remain fully stocked, averaging between 35%-45% of maximum SDI.

Area thinning treatment "H" (surface, ladder, and canopy fuels in CWHR 4M, 4D, 5M, 5D, and 6 class stands) would treat 1,980 forested acres in accordance with the 2004 SNFPA ROD guidelines for Area Thinning treatments in CWHR 4M stands and greater. This treatment applies to stands that are moderately to quite dense and have large areas of continuous surface, ladder and canopy fuels. Most stands have an average SDI ranging from 50% to 75% of maximum, with some stands at over 80% of maximum SDI. Inter-tree competition is reducing stand growth and vigor in approximately half of these stands (densities > 60% of maximum SDI).

Treatment "H" would remove an average between 10 – 30% of stand basal area stocking. Residual average stand basal area would generally range between 210 and 240 square feet. Post treatment stand density would generally average near 50% of maximum SDI. At this level, stand densities are expected to approach 60% of maximum SDI within approximately 20 years. Similar to the modeled stand discussed under DFPZ treatment "B", mistletoe infected trees would be selectively thinned; however, they would still exist in the overstory after thinning. Thinning is expected to reduce but not prevent the spread of mistletoe. Removing infected trees and leaving non-host trees between susceptible white firs would reduce the spread of mistletoe. Mistletoe infection severity of individual trees would continue to increase. Average residual canopy cover would be near 45 percent except in stands with initial lower canopy cover. Canopy cover in area thin treatment units that are classified as CWHR 4M or greater would not be reduced below an average of 40% and no more than 30% of existing canopy cover would be removed.. Due to thinning predominantly smaller diameter trees, average stand diameters would increase by about 4 inches. This treatment would remove trees less than 30 inches dbh; however, most trees to be cut would be 20 inches dbh or less. Trees 30 inches dbh and greater would only be cut to facilitate operability (2004 SNFPA ROD).

Understory vegetation growth in Area Thin treatments is expected to be variable but generally slow, similar to that in DFPZs. Vegetation growth may be further suppressed in Area Thin units because of generally higher canopy cover and stand densities.

Table 3-4 displays the predominant forest cover, and acres of each California Wildlife Habitat Relations (CWHR) class pre- and post Area Thin treatment. This table shows changes in stand structure and density as a result of Area Thin treatments. Most notable is the decrease of CWHR density class "D". The changes in acres of CWHR class reflect a decrease of canopy densities in CWHR "M" and "D" stands, and increases in stand average diameter (causing some stands to increase in CWHR size class) as a result of thinning from below. Changes in CWHR size and density classes as a result of treatments is further summarized in Table 3-4 for all treatments combined.

Direct Effects of Group Selection

Group selection would treat 1,245 acres of forested stands. Groups of trees from ½ to 2 acres in size would have all trees less than 30 inches in diameter cut. Groups would be designed to minimize the inclusion of trees

30 inches and larger however trees 30 inches and greater would reside in some groups. Groups would contain no more than up to twelve residual trees per acre 30" dbh; or larger. Group selections would create very open stand conditions with an approximate canopy cover ranging between 0 – 15%. Approximately 5.7 percent of the available and suitable land base within the project area would be treated by group selection.

Group selection would occur both outside and within area thinning and DFPZ treatments. Approximately 370 acres of group selection are planned within area thinning and 400 acres of group selection are planned within DFPZ treatments.

Table 3-4. Area thin treatments: existing and post treatment forest cover type, and CWHR cover and size class within treated stands.

Forest Cover	CWHR Class	Pre Treatment Acres	Post Treatment Acres
Mixed conifer	1S	13	13
	2S	19	19
	3M	38	3
	3P	38	50
	3S	48	48
	4D	244	0
	4M	1,107	1,207
	4P	214	228
	4S	2	2
	5M	10	163
Ponderosa pine	3M	9	2
	4P	0	7
Red fir	2P	1	1
	2S	2	2
	3D	2	0
	3M	11	0
	4D	73	0
	4M	88	133
	4P	111	118
	4S	8	8
	5M	0	34
	5P	22	22
White fir	2M	9	0
	2S	147	147
	3D	5	0
	3M	21	5
	3P	98	107
	3S	259	259
	4D	30	0
	4M	372	340
	4P	232	275
	5M	0	40
Brush/other	Brush	52	52
Total		3,285	3,285

Source: Almanor Ranger District GIS (Vestra_veg; Creeks FVS output files)
Note: No change to Aspen or Lodgepole Pine

Group selections would be site prepped for reforestation. Site preparation would entail machine or hand piling slash concentrations and burning the piles. Broadcast burning would occur in groups that are within DFPZ or Area Thin treatments that are broadcast burned. Following harvest and fuel treatments, groups will have created openings favorable in most cases for shade intolerant pine regeneration. Smaller group selections (less than 1 acre) and group selections within the red fir forest type would be more favorable for true fir regeneration (McDonald and Abbott, 1994). Seedlings would come from natural, on-site seed sources and planting. Planting would occur on approximately 1,095 acres and would supplement the natural regeneration to achieve desired stocking levels and increase the species composition of shade-intolerant species such as ponderosa, sugar, and Jeffery pine.

Vegetation including grasses, forbs and brush would begin to establish in the newly created openings. Vegetation growth is expected to be slower than that observed in large openings such as clearcuts because of partial shading and resource uptake by overstory trees along group edges. However, vegetation competition is still expected to impact seedling survival and growth (McDonald and Fiddler, 1991). A hand grubbing release treatment would be conducted to minimize competition from competing vegetation on approximately 900 acres to ensure the survival and growth of conifer seedlings within two years of planting. A second hand grubbing or mechanical mastication release treatment would be conducted within five years of planting on approximately 840 acres of groups 1.5 acres or larger with south to west aspects. Sunlight and temperatures in these groups are expected to support relatively vigorous vegetation growth that would compete with establishing conifers. Stocking surveys at year 1 and year 3 after planting would be conducted on all group selections to monitor regeneration, animal damage, and to verify release needs. Seedling protective barriers and/or trapping are planned on approximately 400 acres to reduce damage to the seedlings from deer and pocket gophers. Protective barriers and gopher trapping would be scheduled based on monitoring results at year 1 and year 3 following planting. Protective barriers would be installed and maintained for up to 5 years until seedlings are established. Gopher trapping would occur within 5 years of planting. Reforestation is summarized in Table 3-5.

Table 3-6 displays the predominant forest cover, existing CWHR class, and post treatment CWHR class for the areas to be treated with group selection. Since the group selections are regeneration openings that all classify as CWHR class 1 (seedling) post-treatment, Table 3-5 displays the acres of each forest cover type and CWHR class that are being changed to the CWHR seedling class.

Table 3-5. Group Selection Reforestation Treatments.

Forest Type	Group Size and Aspect	Reforestation Treatments
Pine, Mixed conifer	1 acre or larger, all aspects <1 acre, N to SE aspects	Plant 40:40:20 mixture of PP/JP/SP a minimum of ½ tree length away from group edge for initial stocking density of 250 TPA. Adjust species mix site specifically to include DF where it naturally occurs. Approximately 700 acres
Red fir, White fir	1.5 acre or larger, all aspects	Monitor post harvest for natural regeneration. Plan to plant 70:20:10 mixture of RF/WF/SP-WWP in Red fir zone, 50:20:20:10 WF/RF/JP/SP in White fir zone for initial stocking density of 250 TPA. Approximately 395 acres
All	All	survey all groups for natural regeneration and planting survival at year 1 and year 3. Schedule interplanting where stocking levels are below R5 minimum levels or to promote pine regeneration.
All	1.5 acres or larger, all aspects	Release for survival within 2 years of planting - monitoring may adjust treatment timing. Approximately 900 acres
All	1.5 acres or larger S to W aspect	Release for growth within 3-5 years of planting – monitoring may adjust treatment timing. Approximately 840 acres.
Mixed conifer, Red Fir, White Fir	1.5 acre or larger, all aspects	Monitor for gopher activity and schedule trapping as needed to reduce seedling mortality. Approximately 400 acres.
White fir, Red fir	1.5 acres or larger, all aspects	Install browse protectors to prevent deer browse of terminal buds. Maintain for approximately 5 years. Approximately 400 acres.

Table 3-6. Group selection treatments: existing forest cover, CWHR class, and post treatment CWHR class within treated stands.

Forest Cover Type	Pre Treatment CWHR Class	Post Treatment CWHR Class	Acres
Mixed conifer	3M	1	14
	3P	1	7
	4D	1	124
	4M	1	468
	4P	1	157
	4S	1	3
	5D	1	1
	5M	1	26
	5P	1	5
Ponderosa pine	3D	1	1
	4P	1	1
Red fir	3D	1	11
	3M	1	3
	4D	1	28
	4M	1	64
	4P	1	5
White fir	2S	1	5
White fir	3D	1	1
	3M	1	6
	3P	1	11
	3S	1	2
	4D	1	15
	4M	1	164
	4P	1	109
	4S	1	11
	5M	1	3
Total		1,245	1,245

Source: Almanor Ranger District GIS (Vestra_veg; Creeks FVS output files)
Note: No change to Aspen or Lodgepole Pine

Direct Effects of all Thinning and Group Selection Treatments on CWHR Stand Structure

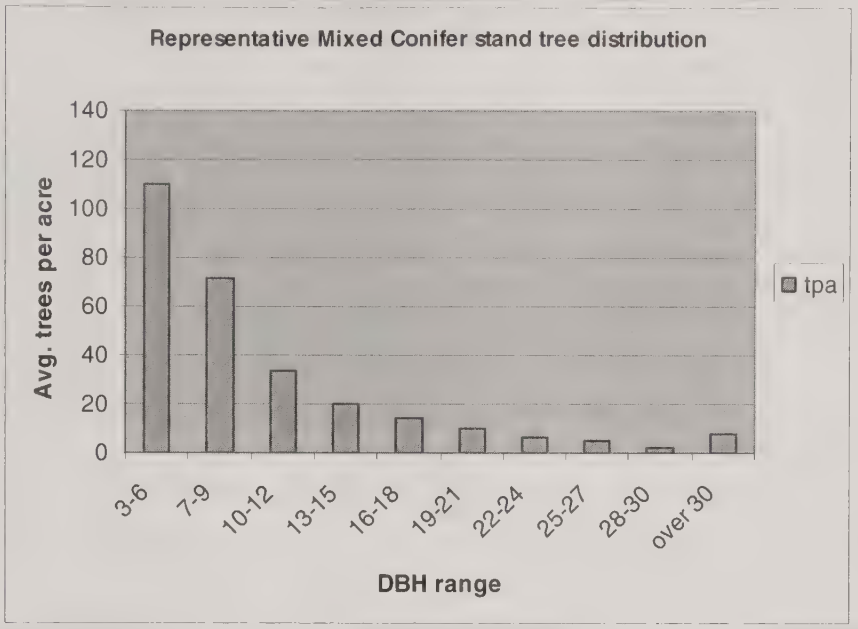
Thinning and group selection would change the distribution of CWHR size classes. There would be an increase in the seedling size class stands and medium/large size class stands, and a corresponding decrease in the pole and small sawtimber size class stands. Stand densities would decrease as a result of treatments. A summary of the distribution of all CWHR classes in the project area showing acres of change resulting from the Proposed Action is displayed in Table 3-7. Most notable is the decrease of nearly 3000 acres of CWHR 4M and 4D density classes. This decrease corresponds to increases in CWHR 4P, 5M and seedling classes. Because each CWHR class represents a range of average stand diameter and canopy cover, the effects of treatments on the CWHR classification will vary by stand. For example, a stand that is near the upper limit of CWHR size class 4 before treatment would classify as a CWHR size class 5 stand after treatment because

thinning from below would increase the average stand diameter above 23.9" DBH (the upper limit for CWHR size class 4 stands). In contrast, a CWHR size class 4 stand that has a smaller initial average diameter (nearer the lower limit of 11" DBH) would still classify as a size class 4 stand after thinning, even though the average diameter was increased a few inches because of thinning from below. In a similar manner, all stands proposed for DFPZ treatment that are CWHR density class D would drop to a lower density class M after treatment because the desired canopy cover for DFPZs is 30-50%. Because of the initial high densities of CWHR "D" stands, and the design of DFPZ treatments, canopy cover is not projected to fall below 40% in those stands. Stands with initially lower densities (CWHR density class M stands that are near or below 50% canopy cover pre-treatment) are projected to drop to CWHR density class P following a DFPZ treatment. Because of canopy cover retention requirements within Area Thinning units, no stands that are CWHR density class M or D pre-treatment would fall below density class M after thinning.

Forest inventory data throughout the project area was compiled to illustrate tree size class distribution within typical mixed conifer and true fir stands that would be thinned under DFPZ treatments B and C, and Area Thin treatments G and H. Preliminary cruise data has been collected to date on approximately 50% of proposed DFPZ treatment B and C and Area Thin treatment G and H mixed conifer and true fir stands, indicating average numbers of trees per acre by DBH class that would be cut under these treatments. Treatments have been designated on the ground either using a leave-tree mark (LTM) down to 3" DBH or a cut-tree mark (CTM) down to 10" DBH depending on initial stand density and configuration. In cut-tree marked units, trees to be cut between 3.0 – 9.9" DBH would be designated by description (in terms of ladder fuel position and tree health). Both the cruise data and representative stand data do not include trees less than 3" DBH. Trees less than 3" DBH are not included in cruise estimates because they are not a removal product within timber sale contracts. Residual undesirable small trees (less than 3" DBH) would be treated in a second entry, generally by hand thinning, either prior to or in combination with underburning. Figures 3-4 and 3-5 depict tree distribution by DBH class in representative mixed conifer and true fir stands prior to thinning. Figures 3-6 and 3-7 depict the residual tree distribution by DBH class in representative mixed conifer and true fir stands after thinning. The average numbers of trees prior to treatment, number of cut trees, and residual trees after thinning are also depicted. These figures do not reflect a specific individual stand, but rather reflect combined averages based on stand inventory data and cut tree cruise data.

Figure 3-4; Representative Mixed Conifer stand tree distribution

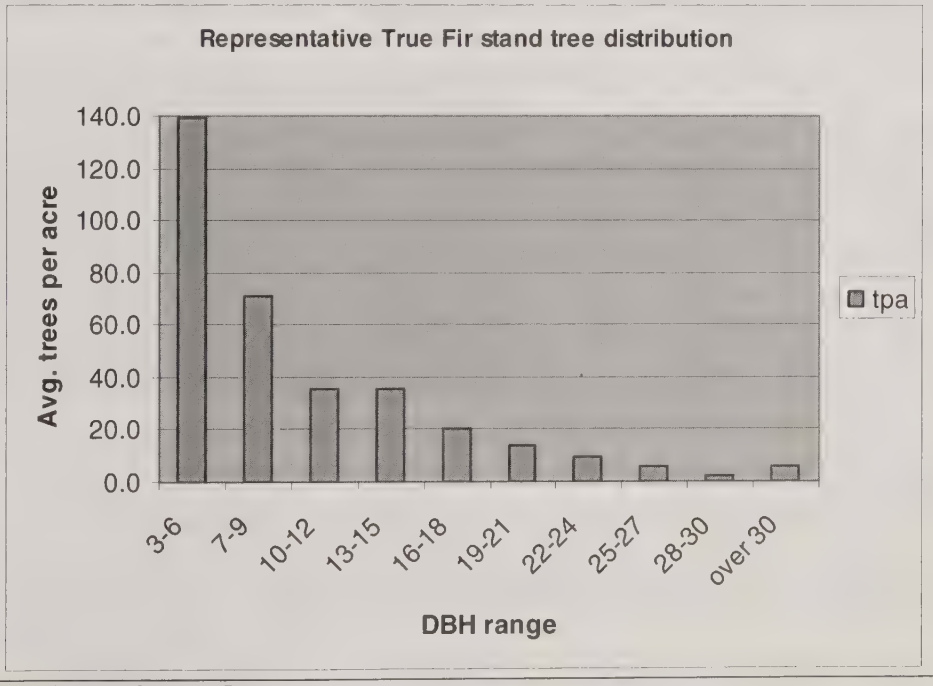
Mixed Conifer DBH range	tpa
3-6	109.9
7-9	71.6
10-12	33.3
13-15	19.8
16-18	14.4
19-21	10
22-24	6.5
25-27	5
28-30	2
over 30	7.7
Total	280.2



Source: Almanor Ranger District Forest Inventory Data

Figure 3-5; Representative True Fir stand tree distribution

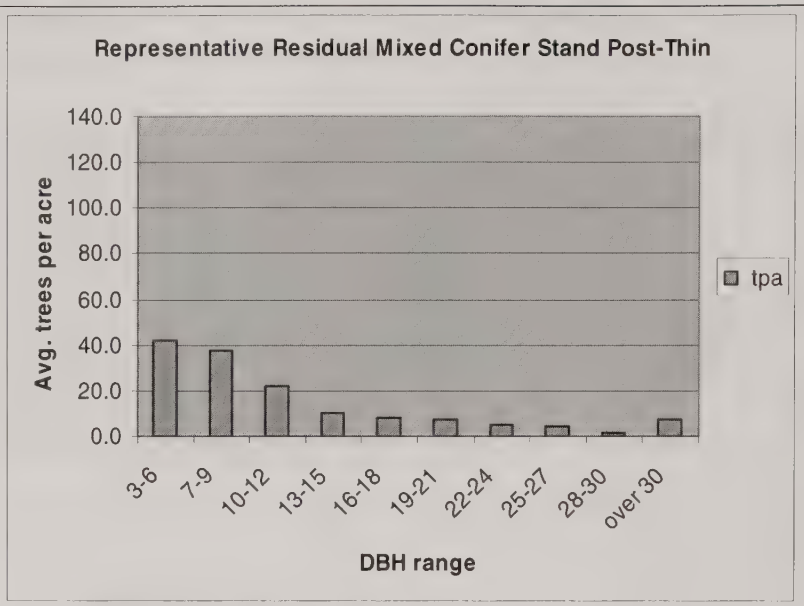
True Fir DBH range	tpa
3-6	139.6
7-9	71.2
10-12	35.4
13-15	35.2
16-18	20.5
19-21	14.0
22-24	9.3
25-27	5.7
28-30	2.5
over 30	5.9
Total	339.3



Source: Almanor Ranger District Forest Inventory Data

Figure 3-6 Representative residual mixed conifer stand, post-thin.

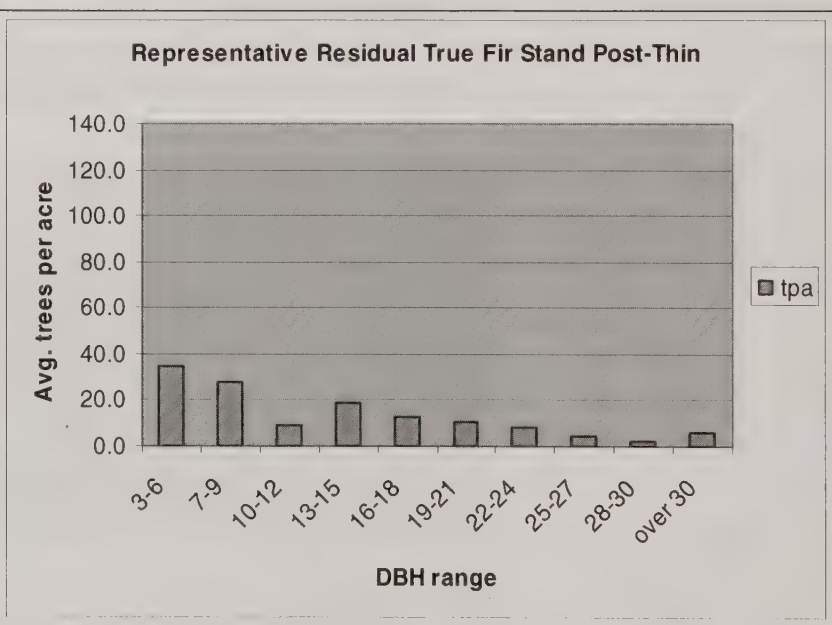
Mixed Conifer dbh Range	tpa	cut tpa	residual tpa
3-6	109.9	67.8	42.1
7-9	71.6	33.7	37.9
10-12	33.3	11.4	21.9
13-15	19.8	9.1	10.7
16-18	14.4	6.1	8.3
19-21	10	2.7	7.3
22-24	6.5	1.1	5.4
25-27	5	0.3	4.7
28-30	2	0.2	1.8
over 30	7.7	0.0	7.7
Total	280.2	132.4	147.8



Source: Almanor Ranger District Forest Inventory Data and Creeks Preliminary Cruise Data

Figure 3-7 Representative residual true fir stand, post-thin.

True Fir dbh Range	tpa	cut tpa	residual tpa
3-6	139.6	104.8	34.8
7-9	71.2	43.4	27.8
10-12	35.4	26.1	9.3
13-15	35.2	16.7	18.5
16-18	20.5	7.7	12.8
19-21	14.0	3.2	10.8
22-24	9.3	1.2	8.1
25-27	5.7	0.8	4.9
28-30	2.5	0.1	2.4
over 30	5.9	0.0	5.9
Total	339.3	204.1	135.2



Source: Almanor Ranger District Forest Inventory Data and Creeks Preliminary Cruise Data

Direct Effects of Harvest Operations and Roads

Harvest operations would have effects on forest stand structure. Helicopter yarding would create up to 22 small clearings for log landings and helicopter maintenance. Some openings already exist; however, most would require clearing of trees. Tractor and cable logging would also require small clearings, or landings, generally less than 1/2 acre, to store logs prior to trucking. Landing size depends on the topography, the number of trees to be brought in, and the harvest equipment. These clearings are expected to reforest with conifers based on field review of past landings within the project area.

Road construction, reconstruction and maintenance would clear trees from the road travel way and ditches. Most trees to be removed are saplings and seedlings, which have become established since construction or the last road maintenance treatment. The construction of 3.7 miles of new temporary road would clear approximately 11 acres of trees of all sizes. Temporary roads would be obliterated at project completion and would be expected to reforest based on field review of old roads within the project area. Road decommissioning is planned for 1.2 miles of road. These roads are adjacent to forested stands and would result in the reforestation of approximately 3 acres. Treatment prescriptions preclude the harvest of trees 30 inches in diameter and larger; however, in some cases, these trees may need to be cut to facilitate operability (2004 SNFPA ROD). These cases could include: clearing for landings, cable yarding corridors, road construction, and hazard tree removal. Clearing for harvest and road construction operations is expected to impact less than 1 percent of the treated areas.

Forest Health

Direct Effects and Control Measures for Annosus Root Disease

The both action alternatives propose to apply an EPA registered borate compound (Sporax) to all cut stumps of true fir and pine trees greater than 14 inches in diameter to protect against the spread of annosus root disease.

Annosus root disease is caused by the fungus *Heterobasidion annosum* and is found in all western conifer species however true fir and pine are especially susceptible to infection (Schmitt, et al 2000). Annosus root disease spreads from root to root contact as well as from infection by airborne spores. Long distance spread can occur when airborne spores contact and infect fresh exposed wounds and stump surfaces (Schmitt, et al 2000). Once *H. annosum* occupies a site, it resides in the soil for up to 50 years as a saprophytic (an organism that obtains food from dead or decaying organic matter) agent.

H. annosum is present in the Creeks Project area, and there is the potential for new infection in harvest areas from aerial dispersion of spores. Infection by *H. annosum* may become more wide spread if stumps are not treated. This would make the long-term control of annosus root disease more difficult and may impact previously unaffected stands, as well as adjacent landowners. The disease could create infection centers where trees of susceptible species would begin to display effects ranging from reduced individual tree vigor, root and bole decay, windthrow, root mortality, and tree mortality. The infection centers would create localized pockets of dead and down trees which would contribute to higher surface fuel accumulation in the future. There are no proven methods for eradicating this disease on a site

Thinning and group selection treatments would occur on approximately 8,303 acres that would include harvest of trees greater than 14" dbh and the application of a borate compound. Sporax is a borate compound registered for use to control *annosum* root disease. When applied to fresh cut stump surfaces, the borate

compound penetrates into the upper stump surface and provides a protective barrier in which *H. annosum* spores are unable to survive. When applied properly, the use of Sporax has been shown to be up to 90% effective at preventing new infections of annosus root disease on stump surfaces (Schmitt et al 2000). The recommended application level is one pound of Sporax to 50 square feet of stump surface (Wilbur Ellis 2001). The basal area requiring Sporax treatment when using a 14-inch lower-dbh limit would range from approximately 45 to 200 square feet per acre, with an average of approximately 89 square feet per acre. Basal area requiring treatment is calculated based on basal area at dbh; however the difference between approximate basal area at dbh versus stump basal area at 1 foot has a negligible effect on estimating average application rates. Given the recommended application level, the amount of Sporax application per acre would range from approximately 0.9 to 4.1 pounds, with an average of approximately1.8 pounds per acre.

The use of sporax has been analyzed for environmental risk and human health and safety within the Creeks project. Control measures to protect aquatic features and TES plants are described in Chapter 2. No sporax would be applied within 25 feet of standing or running water. Sporax application rates would be low (generally less than 1 pound per acre) within RHCA's because of equipment exclusion zones and high levels of tree retention. An application rate of 10 pounds per acre (over 10 times the projected application rate) would result in a concentration level of 100 ppb (parts per billion) of sporax in water. This equates to a Q-value of .0.00004, well above the EPA acute toxicity level of >0.1. Both location and application rate of Sporax would pose little potential for water contamination. Sporax would not be applied during rainfall events to avoid washing off target stump surfaces. A project specific spill plan is included in project records. Research indicates that if a significant spill occurred, it is unlikely that measured amounts in water would be above background, natural levels of boron (Dost et al 1996). The potential for sporax leaching is low as it is adsorbed to mineral particles in the soil (Dost et al. 1996).

High levels of Sporax are considered toxic to soil microorganisms and plants. Application rates of 9 to 15 lbs per 100 square feet (ground surface area) applied directly to vegetation will eradicate plants (Dost et al. 1996). These levels are much higher than application rates proposed for stump treatment. Research data has not indicated elevated levels of boron in foliage, litter or soil adjacent to the treated stump (Dost et al 1996). Research suggests that accumulation of boron resulting from cut stump applications sufficient to harm either nearby plant life, or animals that depend on those plants for subsistence is unlikely (Dost et al 1996).

Extreme cases of chronic over-exposure have produced symptoms of chronic poisoning, respiratory irritation, and chronic eczema in humans, but there is no evidence that Sporax use in a forested setting has resulted in chronic health issues (Dost et al. 1996). Applications of Sporax within the Creeks project would follow all applicable Federal and California rules and regulations, including requirements for worker protection, storage, and environmental protection. Dost et al (1996) concludes "the evidence indicates that workers who apply sporax or DOT to cut stumps are not at risk of adverse effects due to boron exposure. Existing data also indicates that adverse effects of forest uses of sporax or DOT on wildlife or livestock are improbable." Since the use of Sporax has not been shown to cause toxicity to soil, water, plants or humans in a forested setting and the proposed treatment would be a one-time, low dosage site specific application, no measurable cumulative effects are anticipated (Information Ventures 1995; Dost et al. 1996).

Other methods for controlling annosus root disease have been suggested. Many of these alternative methods have been developed for forests in the southeastern United States. Several treatment strategies

(prescribed burning, manipulation of season of cutting to avoid dispersion of spores, and treatment with a competitive nontoxic fungus [*Phlebiopsis gigantea*]) have been recommended in the southeastern region by Mississippi State University Extension and others (Ammon and Patel 2000; Annesi et al. 2005). Intensive prescribed burning before and after treatment, as suggested by Ammon and Patel, may not be a viable option due to prohibitive cost and inherent risk associated with pre-treatment burning. Studies of prescribed burning have shown a reduction of annosus root disease but have not shown burning to control or prevent the infection of annosus. In a study by Froelich et al, (1978), many of the prescribe burn plots showed substantial infection levels of annosus after burning. Cutting when *H. annosum* spores are at their lowest levels has been suggested, however, there are no data or studies to support the effectiveness of such a treatment. The competitive fungus, *Phlebiopsis gigantean*, is not available or registered for use in California and may not be a viable treatment due to the dry summer and fall seasons. The treatment strategies discussed above were developed for forests in the southeastern United States, and there is no literature that suggests that such methods would be effective in California. The amount of Sporax applied within the 8,303 acres of treatment could be reduced by limiting Sporax use to areas that have been identified as having annosus root disease and the immediate proximity. Such target areas may be identified during field preparation activities (such as layout, marking, and cruising) prior to implementing the Creeks Project. Limiting Sporax application to known annosus root disease infection centers would not however protect against infection from airborne spores which can travel for long distances.

Indirect Effects

Indirect Effects of DFPZ, Area Thinning and Group Selection

Thinned stands should increase in overall forest health. Commercial thinning (area thinning and DFPZ thinning) would target the removal of damaged and diseased trees and favor retention of trees free of damage and defect.

Thinning would favor the removal dwarf mistletoe infected trees; however, to maintain desired stocking and canopy cover, some infected trees would remain in the stands. Remaining infected overstory trees would continue to serve as a source for the infection of adjacent and understory trees. Group selection may also decrease levels of overall stand infection by removing individual infected trees and pockets of infected trees; however, infected trees remaining on the edge of groups would serve as a host and spread mistletoe to regeneration in the group area.

Thinning should decrease stand mortality caused by bark beetles. Thinning would remove diseased and injured trees, which are most susceptible to bark beetle caused mortality (Demars and Roettgering, 1982; Ferrel, 1986; Kegley et al., 1997; Smith, 1971), and also reduce tree competition, which can improve resistance to beetle caused mortality.

Thinning and group selection treatments have the potential to increase populations of the pine engraver beetle, *Ips pini*. Large populations commonly infest logging slash, windthrown trees, or trees broken by wind or snow. When populations are low, the beetle may kill or top-kill widely scattered single trees or small groups of trees. However, if large populations build, mortality of live trees can be serious. Proper slash treatments such as lop and scatter, chipping, and piling, and timing of treatments should minimize the slash and downed logs that serve as suitable habitat and maintain populations at endemic levels (Kegley et al., 1997). The Proposed Action includes slash treatments to minimize habitat for the pine engraver beetle.

Table 3-7. Effects of treatments on CWHR size classes in the project area

	CWHR Class - Acres in Project Area, Post Treatment																
	Seedling	Sapling (1" - 5.9" dbh)				Pole (6" - 10.9" dbh)				Small (11" - 23.9" dbh)				Medium/Large (> 24" dbh)			
Forest Cover Type	1	2S	2P	2M	2D	3S	3P	3M	3D	4S	4P	4M	4D	5S	5P	5M	5D
Aspen	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0
Lodgepole pine	0	0	0	0	0	0	29	37	0	0	0	0	0	0	0	0	0
Mixed conifer	867	131	0	8	0	340	497	236	19	178	2,867	5,138	2,098	9	198	1,428	59
Ponderosa pine	1	29	32	0	0	0	173	21	54	11	46	28	0	0	0	0	0
Red fir	110	218	112	0	0	106	171	122	206	186	838	1,509	1,051	29	77	74	92
White fir	326	368	17	8	0	1,156	598	147	110	347	2,572	2,330	976	22	159	231	20
Totals Acres	1,304	746	161	16	0	1,602	1,468	563	389	722	6,341	9,005	4,125	60	434	1,733	171
Change	+1,245	-5	-11	-10	-4	-2	+18	-174	-129	-14	+1,750	-2,034	-898	NC	-5	+274	-1

Source: Almanor District GIS (Vestra_veg)
S1 sparse cover, 10-24 percent canopy cover
P2 open cover, 25-39 percent canopy cover
M3 moderate cover, 40-59 percent canopy cover
D4 dense cover, 60-100 percent canopy cover

Annosus root disease is present in stands throughout the project area. Timber harvest has the potential to increase the disease through freshly cut stumps. Stump infection can be minimized by treating the freshly cut stump surfaces with a light coating of borate compound (Schmitt et al., 2000). The Proposed Action includes stump treatments to minimize annosus infection. True firs are especially susceptible to annosus root disease (Schmitt et al., 2000). The proposed thinning and group selection treatments would favor the retention of pine over red and white fir. This would help reduce the spread of root disease by reducing root-to-root contact between host tree species (true fir) as well as reducing host populations.

Heart rot is most common in old trees, especially red and white fir, old, large diameter trees (30 inches dbh and greater) would be retained. Harvest operations and burning are likely to cause damage, such as bark scrapes and broken limbs, to a minor component of residual trees. These injuries can provide points of entry for heart rot disease (Kimmey and Bynum, 1961). Trees less than 30 inches in diameter with heart rot would be targeted for removal. As a consequence, initial overall levels of heart rot within the treated stands would decrease; however, new infections of heart rot would likely develop as a result of tree injuries caused during harvest operations or prescribed burning.

Cumulative Effects

Cumulative Effects of Proposed DFPZ, Area Thinning and Group Selection

The area considered for silviculture cumulative effects is the project area. The project area boundary is defined on the north and south by areas that are off-base or deferred under the HFQLG Act. The east side of the project area is bordered by private property. The west side of the project area is defined by watershed boundaries. This area was chosen because stand growth and development is primarily dependent on site conditions such as soils, elevation and precipitation. Stand and site conditions elsewhere (outside of the treated stands) generally have little effect on treated stands, with the exception of effects on forests insect populations. Activities and management since 1975 within the project area are considered in this analysis because the effects of the past silvicultural treatments are still occurring (i.e. Improved health and vigor of thinned stands, regeneration of clearcuts, establishment of pine stands). Management activities and events prior to this are considered in this analysis in so far as they have shaped current stand structure conditions.

The existing stand conditions are the result of past management and treatments that include logging, fuelwood harvest, grazing, fire suppression, and tree planting. Stand structure has likely changed since settlement of the project area in the 1800s. Prior to European settlement of the west large trees characterized Sierran forests, relatively open understories with only occasional ladder fuels (Verner and McKelvey, 1994). These are conditions described as Condition Class 1, where ecosystems are intact and functioning within historical parameters and fire frequency is at naturally occurring levels. Open stands dominated by larger trees with relatively few scattered understory trees and regeneration are conditions that support low to moderate intensity ground fires. Returning stands to conditions that more closely reflect Condition Class 1, and where expected flame lengths of wildfires within 90th percentile weather are 4 feet or less are components of the purpose and need for the Proposed Action.

Fire suppression and to a lesser extent, grazing have resulted in an increase in the number of small diameter trees. Grazing and its associated soil disturbance provide suitable soil conditions for seedling establishment. Logging disturbance also creates canopy openings and scarifies the soil, which can lead to seedling establishment. Periodic wildfires, which could have consumed some of the small trees, have been

suppressed. Forests of the Sierra Nevada, including the project area, have developed fuel ladders, accumulations of surface fuels, and there has been an increase of shade-tolerant conifers such as white fir and incense cedar (Verner and McKelvey, 1994) in the forest understory. Since 1945 there has been an increase in the true fir type and a comparable decrease in the pine type in Sierra Nevada forests (Beardsley and Warbington, 1999). This is true of the Creeks Project area as well.

Cumulative Effects of Stand Composition, Structure and Density

Descriptions of current stand composition, structure and density as displayed in Tables 3-1 and 3-2 account for and include changes as a result of past actions, such as timber harvest, described in the list of cumulative actions (appendix A). Previous timber harvest from the mid-1970s to the present occurred on approximately 18,140 acres. Intermediate thinnings occurred on 8,110 acres and include intermediate sanitation, prep step shelterwood, and thinning from below or above. Intermediate sanitation focuses on removing trees that are damaged, diseased, have small live crowns or otherwise exhibit low vigor and growth rate. Prep step shelterwood is a heavy thinning from below to promote the vigor and crown development of future seed bearing trees and is an intermediate thinning prior to a seed step cut (discussed below). Thinning from below removes predominantly smaller trees and retains healthy larger overstory trees. Thinning from above removes decadent or poorly growing overstory trees to release healthy smaller trees from the midstory and understory; healthy overstory trees are retained as well. Regenerative cuttings occurred on 2,230 acres and includes clear cuts and seed step shelterwoods. Clear cuts remove all or virtually all trees and the stand is regenerated by planting. Plantations resulting from these clearcuts are currently typed as CWHR size 2 stands and represent less than 3% (877 acres) of the forest cover in the project area (not including private land). Seed step shelterwoods retain ten to fifteen overstory seed trees per acre to provide seedfall for natural regeneration. Shelterwoods occur in true fir stands and most of the stands still retain the overstory seed trees. Without additional cutting, these stands will continue to develop as two-storied true fir stands with dense regeneration growing in from successive seed crops. Overstory removal occurred on 5,534 acres and entailed removing all or virtually all of a stands overstory while retaining healthy intermediate and understory trees. Where healthy pine were retained or subsequently interplanted, these overstory removal treatments are projected to develop mixed conifer overstories over the next several decades. Salvage harvesting of fire killed or wind thrown trees has occurred on approximately 2,266 acres. While nearly half of the project area has experienced some level of timber harvest in the last 30 years, stand growth data from within the project area suggests that previous harvest and natural mortality has not kept pace with overall forest growth. The current preponderance of CWHR 4M and 4D stands is mostly a result of ingrowth and increasing densification of stands that have been partially cut in the past. With the exception of clearcutting and overstory removal, previous thinnings promote the regeneration of predominantly shade tolerant white fir.

Activities such as Christmas tree cutting, cutting of posts and poles, and firewood have and will continue to have little effect on stand structures except within small localized settings. Christmas tree cutting generally selects for healthy open grown fir seedlings that may otherwise grow into mid or overstory trees, however cutting is concentrated in a narrow band along a few accessible roadways. While firewood cutting occurs throughout much of the project area, the level of removal of dead wood has no appreciable affect on stand growth or understory regeneration. Ground disturbance from vehicles accessing firewood can injure small

trees as well as expose mineral soil as a seed bed for new seedlings, however live overstory trees still provide the most dominant influence on understory development.

DFPZ and Area Thinning would occur within areas of previous harvest activity. In stands that have had previous intermediate thinning, proposed treatments would focus on breaking up undesirable dense pockets of trees and removing ladder fuels growing underneath healthy overstory. Some mid and upper story trees would be removed in stands that were previously lightly thinned (such as intermediate sanitation) to reduce undesirable stand densities and crown fuels. Proposed DFPZ and Area Thin treatments in regeneration cuts or overstory removals would focus on treating surface fuels including brush and thinning young trees to remove ladder fuels and provide crown separation. Stands that have had salvage harvest of fire killed or windthrown trees can contain a wide range of residual stand structure. DFPZ and Area Thin treatments in these areas would primarily focus on protecting healthy residual overstory and understory trees by removing ladder fuels and surface fuel accumulations; mid and upper story trees would be thinned in undesirable dense pockets.

Group selections would increase stand structure diversity and provide regeneration to replace decadent overstory trees as they die out, both within thinned and unthinned stands. Group selections would be site prepped for reforestation. Site preparation would entail machine or hand piling slash concentrations and burning the piles. Broadcast burning would occur in groups that are within DFPZ or Area Thin treatments that are broadcast burned. Following harvest and fuel treatments, groups will have created openings favorable in most cases for shade intolerant pine regeneration, particularly near the center of the openings away from overstory trees at the group edges. Smaller group selections (less than 1 acre) and group selections within the red fir forest type would be more favorable for true fir regeneration (McDonald and Abbott, 1994). Seedlings would come from natural, on-site seed sources and planting. Planting would supplement the natural regeneration to achieve desired stocking levels and increase the species composition of shade-intolerant species such as ponderosa, sugar, and Jeffery pine. With recurring natural seedfall from trees along group edges, fairly dense natural regeneration may likely develop in group openings within the first few decades.

Vegetation including grasses, forbs and brush would begin to establish in the newly created openings. Vegetation growth is expected to be slower than that observed in clearcuts because of partial shading and resource uptake by overstory trees along group edges. However, vegetation competition is still expected to impact seedling survival and growth (McDonald and Fiddler, 1991). A hand grubbing release treatment would be conducted to minimize competition from competing vegetation on approximately 900 acres to ensure the survival and growth of conifer seedlings within two years of planting. A second hand grubbing or mechanical mastication release treatment would be conducted within five years of planting on approximately 840 acres of larger groups (1.5 acres or larger) with South to West aspects within the mixed conifer and pine forest type. Sunlight and temperatures in these groups are expected to support relatively vigorous vegetation growth that would compete with establishing conifers. Seedling protective barriers and/or trapping are planned on approximately 400 acres to reduce damage to the seedlings from deer and pocket gophers. Protective barriers and gopher trapping would be scheduled based on monitoring results at year 1 and year 3 following planting. Protective barriers would be installed and maintained for up to 5 years until seedlings are established. Gopher trapping would occur within 5 years of planting.

The proposed thinning and group selection treatments will retain or promote a higher component of pine within mixed conifer and white fir stands. Lower stand densities in the thinned stands will also promote the

health of pine, since pine do not grow at the higher stocking densities that white and red fir can persist at. Thinned stands will have reduced canopy cover for approximately two to four decades until residual canopies and understory trees grow into the available space. Elsewhere over roughly 40% of the project area stands will grow increasingly dense and continue to experience ingrowth of shade tolerant fir in the understory.

Maintenance treatments are planned within the DFPZ treatment areas on a schedule of 5, 10 and 30 years. These treatments are displayed in Appendix A. The bulk of these treatments would occur in approximately 10 years and would remove small trees and brush through hand treatment, mechanical treatment, or underburning. The planned maintenance treatments would maintain relatively open understories with small amounts of regeneration.

Road construction from past projects throughout the project area has decreased the forested area. Approximately 330 acres of formerly forested lands are now within road right-of-ways. Road construction and decommissioning in the Proposed Action would result in a slight increase (net increase of 0.7 miles) of land in road right-of-way.

Prior to 2002, thinnings were the predominant timber harvest method on private forest lands within the project area at a rate of approximately 10% of private forest lands per decade. Changes in private ownership have caused changes in private forest management within the project area. Currently, approximately 1,721 acres or roughly 60% of private land holdings within the project area are being harvested, predominantly as overstory removal. For cumulative effects analysis, overstory removal or intermediate thinning (partial cutting) is projected to occur over the remaining private commercial timber lands in the project area within the next four decades. In total, overstory removal harvests are projected to occur over 80% of private commercial timber lands and intermediate thinning harvests over the remaining 20%. This estimate does not account for any non-treatment areas such as streamside management zones. Overstory removal harvests would leave low levels of stand density, composed predominantly of thrifty young trees generally between 6" - 12" dbh. This corresponds with CWHR classes 3S. Intermediate thinnings would retain moderate stand densities composed predominantly of thrifty young mature trees generally between 20" to 30" dbh. This corresponds with CWHR classes 4P and 4M.

Cumulative Effects of Forest Health

Previous timber harvest has selectively removed dwarf mistletoe (*Arceuthobium spp.*) from stands however because mistletoe is so widespread it is rarely if ever completely removed from a stand. The most common dwarf mistletoe in the project area infects true fir and is the species discussed for analysis. Shelterwood and other multi-storied stands that have or develop mistletoe in the overstory will spread the disease to the regeneration growing below. Maintaining a species mix so that non-host trees provide some physical barrier between susceptible trees, as well as selectively removing heavily infected trees, particularly in the overstory, helps prevent the development of undesirable infection levels in a stand. Earlier harvest treatments over the last 30 years provided some control for the spread of dwarf mistletoe as heavily infected trees were targeted for removal. More recent thinnings and the proposed action may have a lesser effect of managing the spread of dwarf mistletoe due to prior and existing management direction that prohibits the removal of larger trees that may otherwise be heavily infected with dwarf mistletoe. Dwarf mistletoe infection levels may be decreased in the short term by the proposed action but are likely to increase over time throughout much of the project area

as infected overstory trees remain on site and the relative proportion of susceptible host trees remains high in many stands.

There are 8,312 acres of CWHR class 4M and 5M within the project area not proposed for DFPZ or Area Thinning (29 acres of CWHR class M are scheduled for thinning under the Lost Lake timber sale). Approximately half of these stands are expected to be at densities at or above 60% of maximum SDI. There are also 4,464 acres of CWHR 4D and 5D within the project area not proposed for DFPZ or Area Thinning (36 acres of CWHR class 4D are scheduled for thinning under the Lost Lake timber sale). Virtually all of these stands are expected to have densities above 60% of maximum SDI and most are likely above 70% of maximum SDI. These stands are at risk of widespread mortality from insect attack or drought. Typically, widespread bark beetle attacks occur in dense stands in conjunction with drought conditions when trees are already under stress. These stands are also increasingly likely to experience complete mortality under typical late summer wildfire conditions, particularly as fuels continue to accumulate. A summary of the acres of CWHR class's 4M, 4D, 5M and 5D not proposed for treatment and their current management status are listed in Table 3-8.

Table 3-8. Summary of acres of CWHR 4M, 4D, 5M and 5D not proposed for treatment under the Proposed Action

CWHR Class	Current Management Allocation	Acres
4D	Owl and/or Goshawk PAC	1,192
	Roadless (RAREII)	116
	Other	2,984
4M	Owl and/or Goshawk PAC	1,582
	Roadless (RAREII)	91
	Other	5,597
5D	Owl and/or Goshawk PAC	68
	Roadless (RAREII)	0
	Other	104
5M	Owl and/or Goshawk PAC	322
	Roadless (RAREII)	10
	Other	710

Source: 1993 LNF LRMP, Appendix U

Annosus root disease is expected to remain near current levels throughout the project area. It is speculated that annosus root disease levels may be higher than what existed prior to timber harvesting in past decades, because of past cutting practices and increasing stand densification. In more recent years, harvest operations have included the application of borate compounds that have been shown to be effective in preventing the infection of freshly cut stumps. Stands of mixed species, where root to root contact alternates between host and non-host trees, are less prone to the spread of annosus root disease. Additionally, thrifty well growing trees are thought to have some resistance by outgrowing the rate of infection. The proposed treatments will promote mixed species stands and maintain or improve tree vigor by reducing stand densities, however thinnings are not expected to remove all annosus infection, nor will it address infections outside of treatment stands.

Other Effects Relative to Seral Stages, Wildlife Habitat Relationship (WHR)

The 1993 LNF LRMP direction for vegetation diversity states "provide at least 5% of the acreage of each vegetation type that occurs in a management area in each seral stage. Where 5% of each type is not available, plan to correct the deficit". The project area falls within the management areas 37 and 45. The 1993 LNF

LRMP uses the Wildlife Habitat Relationship (WHR) classification system to identify seral stages. This classification system differs from CWHR and the two should not be confused. Table 3-9 describes the WHR stand codes.

Table 3-9. WHR stand classification

WHR Size Code	WHR Canopy Code	Description
1	N/A	Barren, grass, forbs
2	A	Shrub/seedling/sapling < 11 inches dbh; < 40% canopy closure
	B	Shrub/seedling/sapling < 11 inches dbh; 40-70% canopy closure
	C	Shrub/seedling/sapling < 11 inches dbh; >70% canopy closure
3	A	Small sawtimber 11-24 inches dbh; < 40% canopy closure
	B	Small sawtimber 11-24 inches dbh; 40-70% canopy closure
	C	Small sawtimber 11-24 inches dbh; >70% canopy closure
4	A	Medium to large sawtimber >24 inches dbh; < 40% canopy closure
	B	Medium to large sawtimber >24 inches dbh; 40-70% canopy closure
	C	Medium to large sawtimber >24 inches dbh; >70% canopy closure
5	N/A	Two storied stand; scattered overstory above well-stocked understory

Source: 1993 LNF LRMP Appendix U

The existing and post-treatment Wildlife Habitat Relation (WHR) seral stage acres are displayed in Table 3-10 and 3-11.

Treatments planned in the Proposed Action would change the WHR size class of numerous stands. Thinning from below in the area thinning treatments and DFPZ treatment "A" would remove predominantly smaller trees and result in greater average stand diameters. The treatments would also indirectly affect the future WHR size classes by decreasing stocking which should allow for increased individual tree diameter growth. Over time, the Proposed Action should result in larger diameter stands in comparison to no treatment.

Treatments under the Proposed Action lead to a decline below 5% of WHR 2C (shrub/seedling/saplings <11 inches dbh with >70% canopy cover) stands, to a post treatment level of 4%. The number of seral stage 2C acres would increase and is expected to meet or exceed 5% within the next ten to twenty years as the canopies of untreated young seral stage 2B stands fill in. Group selection treatments create WHR seral stage 2A stands (seedlings). These stands would grow into 2B and 2C stands as tree crowns develop.

Culmination of Mean Annual Increment

Stands proposed for area and DFPZ thinning, and group selection harvests were not evaluated for culmination of growth. These treatments are not subject to the CMAI finding. Thinning treatments are exceptions permitted as sound silvicultural practices to meet multiple use objectives (36 CFR 219.16(2)(iii)). Group selection harvest is an uneven-aged treatment.

Restocking Within Five Years

All stands proposed for silvicultural treatment can be adequately restocked within five years of final harvest. Stands in the vicinity with comparable site conditions have received similar silvicultural treatment and resulted in full stocking within five years of final harvest.

Timber Suitability

On lands classified not suited for timber production, timber harvest would not occur (36 CFR 219.14 (a).

Table 3-10. Management Area 37: existing and post-treatment seral stages

Vegetation Type		Existing WHR Seral Stage										
		1	2A	2B	2C	3A	3B	3C	4A	4B	4C	5
Grass/Brush	Acres	1,137										
	Percent	100										
Mixed conifer	Acres	0	3,058	1,068	791	5,886	15,476	405	268	2,341	68	0
	Percent	0	10	4	3	20	53	1	1	8	0	0
Red fir	Acres	0	1,055	403	459	1,184	4,073	1,635	0	197	204	0
	Percent	0	11	4	5	13	44	18	0	2	2	0
		Post-Treatment WHR Seral Stage										
		1	2A	2B	2C	3A	3B	3C	4A	4B	4C	5
Grass/Brush	Acres	1,137										
	Percent	3										
Mixed conifer	Acres	0	4,247	926	734	7,280	12,983	0	594	2,527	68	0
	Percent	0	14	3	3	25	44	0	2	9	0	0
Red fir	Acres	0	1,157	335	384	1,765	3,710	1,459	0	197	204	0
	Percent	0	13	4	4	19	40	16	0	2	2	0

Source: Almanor Ranger District GIS, Vestra-veg, Creeks FVS output files

Table 3-11. Management Area 45: existing and post-treatment seral stages

Vegetation Type		Existing WHR Seral Stage										
		1	2A	2B	2C	3A	3B	3C	4A	4B	4C	5
Grass/Brush	Acres	3,540										
	Percent	100										
Mixed conifer	Acres	0	1,233	315	44	2,473	7,162	54	411	2,189	0	0
	Percent	0	9	2	0	18	52	0	3	16	0	0
Red fir	Acres	0	604	88	19	570	729	26	105	29	33	0
	Percent	0	27	4	1	26	33	1	5	1	1	0
		Post-Treatment WHR Seral Stage										
		1	2A	2B	2C	3A	3B	3C	4A	4B	4C	5
Grass/Brush	Acres	1,137										
	Percent	100										
Mixed conifer	Acres	0	1,278	309	5	2,573	7,032	23	472	2,189	0	0
	Percent	0	9	2	0	19	50	0	3	16	0	0
Red fir	Acres	0	615	88	19	589	700	26	105	29	33	0
	Percent	0	28	4	1	27	32	1	5	1	1	0

Source: Almanor Ranger District GIS, Vestra-veg, Creeks FVS output files

Alternative 2 - No Action

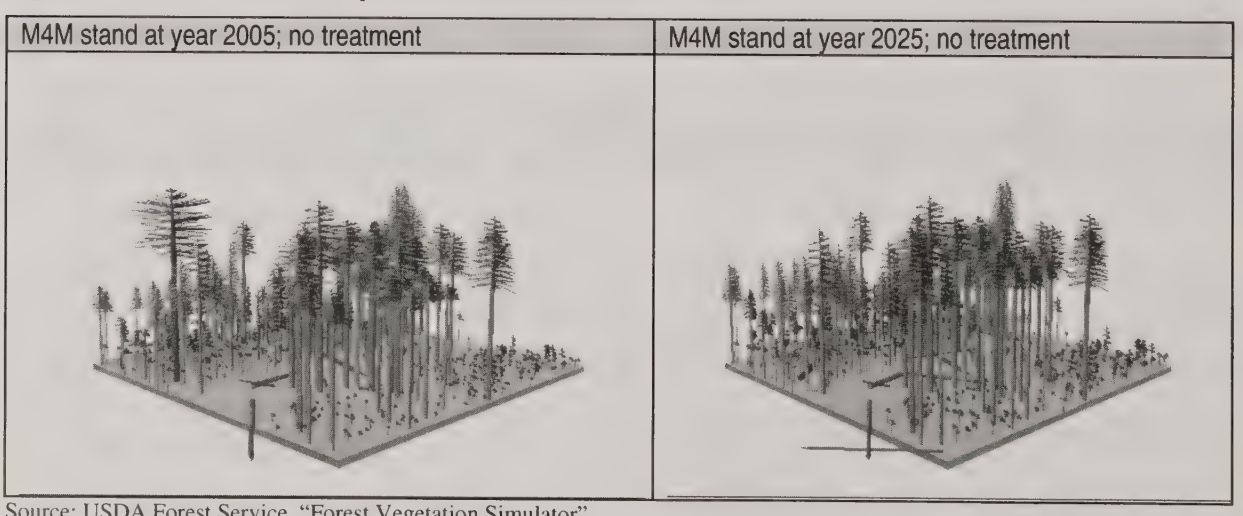
Direct Effects

With little or no disturbance, growth rates in stands near or above 60% of maximum SDI would continue to decrease. Average stand DBH would change little in these stands without disturbance. CWHR density "M" stands would slowly shift into canopy density "D" where site resources can support these densities. The more open stands (CWHR canopy density "P" and "S") would generally grow at faster rates due to less inter-tree competition. Their growth rates would be dictated more by factors of site quality rather than stand density. Natural disturbance could change the CWHR size class distribution. Pockets of mortality due to insects, disease, windfall, or wildfire could create CWHR class 1 stands. Mortality of understory trees due to competition, insects, or disease, and growth of residual overstory trees would increase size class; however, selective bark beetle mortality of large diameter trees could cancel this affect and reduce the size class of stands. As stands reach and persist at maximum densities, they would remain at high risk of widespread mortality from insect and disease outbreaks and/or wildfire (Ferrel, 1986).

Indirect and Cumulative Effects of stand composition, structure and density

Cumulative effects of no treatment are discussed for the representative modeled M4M stand described in the direct effects discussion of the Proposed Action, and then for the project area as a whole. Average stand conditions of the modeled stand at year 2005 and projected to year 2025 are pictured below in Figure 3-8. Growth projections are based on the FVS model and adjusted by measured growth rates of similar stands within the project area. The representative stand is currently at 61% of maximum SDI and would approach 70% of maximum SDI by year 2025. Average stand diameter would increase by two inches in 20 years, from an average dbh of 18 inches to 20 inches. Basal area would increase from 220 square feet per acre to 270 square feet per acre and canopy cover increases by 4% to an average of 44% (in trees 6 inches dbh and above).

Figure 3-8. Stand conditions at year 2005 and 2025 with no treatment



Source: USDA Forest Service, "Forest Vegetation Simulator"

Pine would become increasingly susceptible to mortality as stand densities increase and stands would continue to shift to an increasing composition of shade tolerant species that are more adapted to persist at high densities. Stands that have been thinned within the last 30 years would grow at faster rates and be less susceptible to density related mortality; however, they would also have an increasing composition of shade tolerant trees as

these species continue to establish and grow into the understory canopy. Pine regeneration would depend upon the creation of natural gaps such as windthrow or pockets of bug kill that provide favorable light levels and seed bed conditions for the establishment and growth of pine seedlings. Existing pine plantations and overstory removal stands that have been interplanted would continue to grow up into CWHR size class 3 and beyond, providing future pine overstory over approximately 3% of the project area.

Because average stand diameter growth is slow at higher densities, only a small portion of CWHR size class 4 stands would grow up into size class 5. Most of these would be recruited from larger diameter CWHR 4P stands whose open structure is a result from previous thinning. The predominant change in CWHR size and density class distribution over the next two decades under no treatment would be an increase in CWHR 3M and 4M stands such that they would account for nearly half of the acres of forest cover type in the project area. Open canopied stands (less than 40% cover) of all size classes would account for approximately 20% of the acres of forest cover type in the project area.

Indirect and Cumulative Effects of Forest Health

In 2005 dwarf mistletoe has infected approximately 32% of the modeled stand and by year 2025 is projected to infect 83% of the stand, predominantly in white fir. The average DMR for infected white fir trees increases from 2.1 in year 2005 to 3.5 in year 2035, and the number of infected trees per acre increases from 92 per acre to 280 per acre. The percent of infected white fir within the stand increased from 20% in 2005 to 89% of the trees in year 2025. This indicates that with no treatment, stands that currently have a light infection of mistletoe and are moderate to heavily stocked with white fir are expected to become increasingly infected at fairly rapid rates. However, infection severity is slower to develop in highly dense stands due to low tree vigor (Filip et al., 2000) and subsequent reduced production of dwarf mistletoe seed.

The risk of bark beetle outbreaks causing large-scale mortality in pines would increase over time as stands grow increasingly dense. This would run counter to the desired condition of stands dominated by fire resistant pine in the overstory. Of particular concern are mountain, Jeffrey and western pine beetles because of their aggregating behavior. When there is an abundance of food (trees that are successfully attacked), pine beetle population outbreaks can occur and cause large-scale mortality across forest stands (DeMars and Roettgering, 1982; Amman et al., 1989; Smith, 1971). Stands at most risk in the project area those stands with high levels of stocking (60% of maximum SDI or more), especially during periods of extended drought (Demars and Roettgering, 1982; Ferrel, 1986; Kegley et al., 1997; Smith, 1971). Approximately 43 percent or 12,347 acres of the project area forest stands are at or above 60% of maximum SDI. With no treatment or major disturbance, an additional 2,486 acres or 9% of forested stands would reach or exceed 60% of maximum SDI for an average of over 50% of the project area in a densely stocked condition.

Because pine is a lesser component of higher elevation true fir stands, the risk of bark beetle outbreak would be considerably less in these areas. However, pine cannot survive at the higher densities that true fir can, such that although the risk of beetle outbreak would be low, the likelihood of pine mortality would still be high. Levels of rot would be expected to remain fairly constant with no treatment.

Alternative 14 –

Direct Effects to Stand composition, Stand structure and Density

Direct Effects of DFPZ Treatments A, B, C and E

Alternative 14 would apply the same DFPZ treatments as described under the proposed action with the exception of a change to prescription E on 612 acres that are identified for treatment A or B under the proposed action. Under treatment prescription E, non treated "leave islands" would be retained over 10% of the treatment stands. These non-treated areas would be ¼ acre or less in size and would focus on leaving dense pockets of smaller understory trees. Thinning would occur around the pockets to prevent them serving as ladder fuels to adjacent overstory leave trees. Non-treated "leave islands" would retain an additional component of understory trees in the DFPZ units to provide additional cover and stand heterogeneity for furbearer habitat. Under treatment E, canopy cover would be retained at a minimum of 40% where it is preexisting. The non-treatment leave islands would not have desirable fuel configurations and would be susceptible to torching during a wildfire. To retain a minimum average 40% canopy cover, some midstory and overstory trees would be retained under prescription E that would be removed under the proposed action to break up canopy fuels and favor the growth of adjacent desirable leave trees. Table 3-12 lists treatment acres and the differences between treatments A, B and E.

Table 3-12 Comparison of Treatments A, B and E.

	Treatment A	Treatment E (change from A)	Treatment B	Treatment E (change from B)
Treatment acres	--------	60	----------	552
Thinning Treatment	Surface and ladder fuels, generally up to 12" dbh	same	Surface, ladder and canopy fuels, predominantly ≤20" dbh	same
Residual canopy cover	Generally <40%	Retain 40% where preexisting	30% - 50%	40% - 50%
Basal area removed	10% -20%	9% – 18%	20% - 40%	18% - 36%
Non-treatment areas	none	10%	none	10%

As in the proposed action, prescribed burning would be conducted in DFPZ stands post-thinning to remove surface fuels in excess of desired levels (5 tons/acre or less of down woody material less than 12 inches diameter). The risk of mortality from prescribed burning would be higher in non-treated leave islands however prescribed fire mortality levels would still be low, generally from 0% - 7% of stand basal area. Mortality risk in leave islands would be minimized by controlled ignitions within the leave islands. Prescribed burning would not appreciably alter post-thinned stand structure.

Understory vegetation growth would be similar as described under the proposed action. Vegetation growth would be suppressed within dense leave islands. Projected DFPZ maintenance treatments and their timing would be the same as under the proposed action. Canopy cover retention is within the range analyzed under the proposed action and the non-treatment leave islands would not alter projected post-treatment vegetation types.

Table 3-13 displays the predominant forest cover, and acres of each California Wildlife Habitat Relations (CWHR) class pre- and post DFPZ treatment. This table shows changes in stand structure and density as a result of DFPZ treatments. Changes in CWHR size and density classes as a result of treatments is further summarized in Table 3-6 for all treatments combined.

Direct Effects of Area Thin Treatments F, G, and H

Area thinning treatments would be the same as under the proposed action with the exception that 53 acres of group selections within Area Thin treatment H units would be dropped, and these would instead be left as non-treated leave islands. The reduced acres of group selection and inclusion of leave islands within Area Thin units would maintain average canopy cover at or above 40% in CWHR 4M, 4D, and 5M stands. Canopy cover retention would apply to CWHR 5D or 6 stands as well however none of these stand types occur within proposed Area Thin units. Thinning would be conducted outside of the non-treatment leave islands as described under the proposed action and basal area removed would fall within the range analyzed in the proposed action. Acres of Area Thin (all within treatment H) would increase by 53 acres for a total of 3,338 acres to account for the leave islands incorporated into the thinning units. As in the proposed action, prescribed burning would be conducted in Area Thinned stands post-thinning to remove surface fuels in excess of desired levels (5 tons/acre or less of down woody material less than 12 inches diameter). The risk of mortality from prescribed burning would be higher in non-treated leave islands however prescribed fire mortality levels would still be low, generally from 0% - 7% of stand basal area. Mortality risk in leave islands would be minimized by controlled ignitions within the leave islands. Prescribed burning would not appreciably alter post-thinned stand structure.

Understory vegetation growth would be as described under the proposed action with the exception that vegetation growth would be slower in unthinned leave islands.

Table 3-14 displays the predominant forest cover, and acres of each California Wildlife Habitat Relations (CWHR) class pre- and post Area Thin treatment. The changes in acres of CWHR class reflect a decrease of canopy densities in CWHR "D" stands, and increases in stand average diameter (causing some stands to increase in CWHR size class) as a result of thinning from below. Changes in CWHR size and density classes as a result of treatments is further summarized in Table 3-6 for all treatments combined.

Table 3-13. Alternative 14 DFPZ treatments: existing and post treatment forest cover type, and CWHR cover and size class within treated stands.

Forest Cover	CWHR class	Pre Treatment Acres	Post Treatment Acres
Mixed Conifer	1S	14	14
	2S	20	20
	3M	20	10
	3P	219	219
	3S	97	97
	4D	262	0
	4M	1,376	601
	4P	669	1664
	4S	61	61
	5M	381	433
	5P	25	25
Ponderosa Pine	2D	4	0
	2P	43	32
	2S	29	29
	3D	47	0
	3M	19	8
	3P	75	89
	4M	0	28
	4P	4	35
	4S	10	10
Red Fir	2S	16	16
	3D	62	0
	3M	65	14
	3S	9	9
	4D	76	0
	4M	407	206
	4P	15	390
	4S	14	14
	5M	1	16
	5P	1	1
White Fir	2M	1	0
	2S	67	67
	3P	188	189
	3S	254	254
	4D	46	0
	4M	451	133
	4P	525	880
	4S	184	184
	5M	25	34
	5P	12	12
Brush/other	x	111	111
Total		5,905	5905

Source: Almanor Ranger District GIS (Vestra_veg; Creeks FVS output files)

Table 3-14. Alternative 14 Area thin treatments: existing and post treatment forest cover type, and CWHR cover and size class within treated stands.

Forest Cover	CWHR	Pre Treatment Acres	Post Treatment Acres
Mixed conifer	1S	13	13
	2S	19	19
	3M	38	3
	3P	38	50
	3S	48	48
	4D	244	0
	4M	1138	1238
	4P	216	229
	4S	2	2
	5M	11	164
Ponderosa pine	3M	9	2
	4P	0	7
Red fir	2P	1	1
	2S	2	2
	3D	2	0
	3M	11	0
	4D	73	0
	4M	90	136
	4P	111	118
	4S	8	8
	5M	0	34
	5P	22	22
White fir	2M	9	0
	2S	147	147
	3D	5	0
	3M	21	5
	3P	99	109
	3S	259	259
	4D	30	0
	4M	388	356
	4P	232	275
	5M	0	40
brush/other	brush	52	52
Total		3,338	3,338

Source: Almanor Ranger District GIS (Vestra_veg; Creeks FVS output files)
Note: No change to Aspen or Lodgepole Pine

Direct Effects of Group Selection

Group selection would occur on 1,186 acres of forested stands, for a reduction of 59 acres of group selection as compared to the proposed action. In addition to dropping 53 acre of group selection within Area Thin treatment H units, 6 acres of group selection would be dropped out of a newly formed goshawk protected activity center (PAC). Group selections, including site preparation and reforestation treatments would be the same as described in the proposed action. Planting and release treatments would be reduced by a total of 53

acres; 32 acres in mixed conifer stands and 21 acres in true fir stands. Proposed gopher trapping and deer browse protection would be reduced by approximately 20 acres.

Table 3-15 displays the predominant forest cover, existing CWHR class, and post treatment CWHR class for the areas to be treated with group selection. Since the group selections are regeneration openings that all classify as CWHR class 1 (seedling) post-treatment, Table 3-15 displays the acres of each forest cover type and CWHR class that are being changed to the CWHR seedling class.

Table 3-15. Alternative 14 Group selection treatments: existing forest cover, CWHR class, and post treatment CWHR class within treated stands.

Forest Cover Type	Pre Treatment CWHR Class	Post Treatment CWHR Class	Acres
Mixed conifer	3M	1	13
	3P	1	7
	4D	1	124
	4M	1	437
	4P	1	156
	4S	1	3
	5D	1	1
	5M	1	26
	5P	1	5
Ponderosa pine	3D	1	1
	4P	1	1
Red fir	3D	1	11
	3M	1	3
	4D	1	27
	4M	1	62
	4P	1	5
White fir	2S	1	5
	3D	1	1
	3M	1	6
	3P	1	9
	3S	1	2
	4D	1	13
	4M	1	148
	4P	1	109
	4S	1	10
	5M	1	1
Total			1186

Source: Almanor Ranger District GIS (Vestra_veg; Creeks FVS output files)
Note: No change to Aspen or Lodgepole Pine

Direct Effects of all Thinning and Group Selection Treatments on CWHR Stand Structure

Direct effects on the distribution of CWHR classes would be marginally different from the proposed action. Overall there would be a slight increase in CWHR canopy class M stands and a slight decrease in the CWHR seedling class as compared to the proposed action. There would be 59 acres or approximately 4% less of seedling size class than the proposed action. There would be slightly less, approximately 2%, acres of size class increase resulting from thinning from below. Higher canopy retention would increase CWHR 4M strata by 232 acres or 3% over the proposed action. A summary of the distribution of all CWHR classes in the project area showing acres of change resulting from the Alternative is displayed in Table 3-16. Similar to the proposed action, most notable is the decrease of nearly 2700 acres of CWHR 4M and 4D density classes. This decrease corresponds to increases in CWHR 4P, 5M and seedling classes. The trends and causes of general canopy decrease and size class increase are the same as analyzed under the proposed action .

Direct Effects of Harvest Operations and Roads

Effects of harvest operations and roads would be the same as analyzed under the proposed action alternative.

Direct Effects to Forest Health

Direct Effects and Control Measures for Annosus Root Disease

Alternative 14 would include the use of Sporax as described and analyzed in the proposed action alternative. Approximately 114 less acres would be treated with sporax due to non-treatment leave islands and less group selections. Thinning and group selection treatments would occur on approximately 8,189 acres that would include harvest of trees greater than 14" dbh and the application of a borate compound (Sporax).

Indirect Effects

Indirect Effects of DFPZ, Area Thinning and Group Selection

The indirect effects of Alternative 14 on forest health would be similar to those discussed under the proposed action. A minimum of 40% canopy cover retention and 10% leave islands under DFPZ treatment E, and the inclusion of leave islands within approximately 803 acre of Area Thin units would cause additional retention of mistletoe infected trees. This could be partly minimized by not placing leave islands around infected trees. Infected trees would still be retained in dropped (non-treatment) group selections and to maintain 40% canopy within DFPZ treatment E stands. This is expected to cause a slight but likely immeasurable increase in mistletoe infection rates. Density within leave islands would cause them to be more susceptible to insect attack, particularly during drought conditions. Leave islands of small diameter trees would be less at risk of bark beetle attack because their size makes them less favorable as host material (DeMars and Roettgering, 1982, Amman et al, 1989). Although small localized beetle infections could occur, it is unlikely they would measurable spread into thinned stands because healthy residual trees would more likely successfully defend against attack.

The indirect effects of Alternative 14 on annosus root disease and heart rot would be the same as analyzed under the proposed action.

Table 3-16. Effects of treatments on CWHR size classes in the project area

	CWHR Class - Acres in Project Area, Post Treatment																
	Seedling	Sapling (1" - 5.9" dbh)				Pole (6" - 10.9" dbh)				Small (11" - 23.9" dbh)				Medium/Large (> 24" dbh)			
Forest Cover Type	1	2S	2P	2M	2D	3S	3P	3M	3D	4S	4P	4M	4D	5S	5P	5M	5D
Aspen	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0	0	0
Lodgepole pine	0	0	0	0	0	0	29	37	0	0	0	0	0	0	0	0	0
Mixed conifer	834	131	0	8	0	340	497	245	19	178	2,707	5,322	2,098	9	198	1,429	59
Ponderosa pine	1	29	32	0	0	0	173	21	54	11	46	28	0	0	0	0	0
Red fir	107	218	112	0	0	106	171	124	206	186	807	1,541	1,052	29	77	74	92
White fir	303	368	17	8	0	1,156	599	147	110	347	2,572	2,346	978	22	159	233	20
Totals Acres	1,245	746	161	16	0	1,602	1,469	574	389	722	6,150	9,237	4,128	60	434	1,735	171
Change	+1,186	-5	-11	-10	-4	-2	+19	-163	-129	-14	+1,559	-1,802	-895	NC	-5	+277	-1

Source: Almanor District GIS (Vestra_veg)
S1 sparse cover, 10-24 percent canopy cover
P2 open cover, 25-39 percent canopy cover
M3 moderate cover, 40-59 percent canopy cover
D4 dense cover, 60-100 percent canopy cover

Cumulative Effects

Cumulative Effects of Proposed DFPZ, Area Thinning and Group Selection

Cumulative effects of Alternative 14 would be predominantly the same as those analyzed under the proposed action.

Stand Composition, Structure and Density

As described in the proposed action, DFPZ and Area Thinning would occur within areas of previous harvest activity. Non-treatment leave islands within DFPZ and Area Thin treatments would retain dense pockets of understory and overstory trees on approximately 114 acres. Because these leave islands are relatively small and dispersed, residual stand structures would still be predominantly open and dominated by irregularly spaced overstory trees. There would be a minor decrease (approximately 5%) of acres of group selection as compared to the proposed action. The cumulative effects of group selections would be essentially the same as discussed under the proposed action.

The proposed DFPZ and Area Thin treatments would retain a higher component of pine within mixed conifer and white fir stands. As in the proposed action, stand densities in the thinned units would promote the health of pine. This "release" affect of decreased competition would be shorter lived in DFPZ prescription E stands because higher initial densities would be retained. These stands are expected to grow to undesirable maximum densities approximately one decade sooner than similar stands under DFPZ treatment B. However, all thinned stands are still expected to remain below undesirable maximum densities for approximately 15 to 20 years. Young stands or stands that are initially sparse (CWHR canopy class S and P) may remain below undesirable maximum densities for three decades or more. Projected DFPZ maintenance treatments and their timing would be the same as under the proposed action. Canopy cover retention is within the range analyzed under the proposed action and the non-treatment leave islands would not alter projected post-treatment vegetation types.

Cumulative Effects Forest Health

Cumulative effects of forest health would be little changed from the proposed action. Dwarf mistletoe infection levels may be decreased in the short term under alternative15 but are likely to increase over time throughout much of the project area as infected overstory trees remain on site. The affects of annosus root disease and of stand densities outside of treatment units would be as described under the proposed action alternative.

Other Effects Relative to Seral Stages, Wildlife Habitat Relationship (WHR)

The 1993 LNF LRMP direction for vegetation diversity states "provide at least 5% of the acreage of each vegetation type that occurs in a management area in each seral stage. Where 5% of each type is not available, plan to correct the deficit". The project area falls within the management areas 37 and 45. The Wildlife Habitat Relationship (WHR) classification system used to identify seral stages is described under the proposed action alternative.

The existing and post-treatment Wildlife Habitat Relation (WHR) seral stage acres under Alternative 14 are displayed in Table 3-17 and 3-18.

The affects of treatments on WHR seral stage is the same as described in the proposed action alternative.

Table 3-17. Management Area 37: existing and post-treatment seral stages

Vegetation Type		Existing WHR Seral Stage										
		1	2A	2B	2C	3A	3B	3C	4A	4B	4C	5
Grass/Brush	Acres	1,137										
	Percent	100										
Mixed conifer	Acres	0	3,058	1,068	791	5,886	15,476	405	268	2,341	68	0
	Percent	0	10	4	3	20	53	1	1	8	0	0
Red fir	Acres	0	1,055	403	459	1,184	4,073	1,635	0	197	204	0
	Percent	0	11	4	5	13	44	18	0	2	2	0
		Post-Treatment WHR Seral Stage										
		1	2A	2B	2C	3A	3B	3C	4A	4B	4C	5
Grass/Brush	Acres	1,137										
	Percent	3										
Mixed conifer	Acres	0	4,195	935	734	7,120	13,183	2	594	2,530	68	0
	Percent	0	11	2	2	18	33	0	1	6	0	0
Red fir	Acres	0	1,154	337	384	1,734	3,742	1,460	0	197	204	0
	Percent	0	3	1	1	5	9	4	0	0	1	0

Source: Almanor Ranger District GIS, Vestra-veg, Creeks FVS output files

Table 3-18. Management Area 45: existing and post-treatment seral stages

Vegetation Type		Existing WHR Seral Stage										
		1	2A	2B	2C	3A	3B	3C	4A	4B	4C	5
Grass/Brush	Acres	3,540										
	Percent	100										
Mixed conifer	Acres	0	1,233	315	44	2,473	7,162	54	411	2,189	0	0
	Percent	0	9	2	0	18	52	0	3	16	0	0
Red fir	Acres	0	604	88	19	570	729	26	105	29	33	0
	Percent	0	27	4	1	26	33	1	5	1	1	0
		Post-Treatment WHR Seral Stage										
		1	2A	2B	2C	3A	3B	3C	4A	4B	4C	5
Grass/Brush	Acres	1,137										
	Percent	100										
Mixed conifer	Acres	0	1,278	309	5	2,573	7,032	23	472	2,189	0	0
	Percent	0	9	2	0	19	50	0	3	16	0	0
Red fir	Acres	0	615	88	19	589	700	26	105	29	33	0
	Percent	0	28	4	1	27	32	1	5	1	1	0

Source: Almanor Ranger District GIS, Vestra-veg, Creeks FVS output files

Culmination of Mean Annual Increment

Stands proposed for area and DFPZ thinning, and group selection harvests were not evaluated for culmination of growth. These treatments are not subject to the CMAI finding. Thinning treatments are exceptions permitted as sound silvicultural practices to meet multiple use objectives (36 CFR 219.16(2)(iii)). Group selection harvest is an uneven-aged treatment.

Restocking Within Five Years

All stands proposed for silvicultural treatment can be adequately restocked within five years of final harvest. Stands in the vicinity with comparable site conditions have received similar silvicultural treatment and resulted in full stocking within five years of final harvest.

Timber Suitability

Timber harvest would not occur on lands classified as not suited for timber production (36 CFR 219.14 (a).

Fire / Fuels / Air Quality

Affected Environment

The Fire and Fuels Affected Environment for the Creeks Project area is described by the following parameters: historic fires, stand structures and composition, Condition Classes, fire weather, fire hazard assessment, existing fuel conditions, and fire behavior.

Historic Fires

Fire risk refers to the probability of an ignition occurring as determined from historical fire record data. The project area experiences fires caused from both people and lightning, with the majority of the fires starting from lightning. Fire risk due to lightning cannot be changed. From 1911 through 2002, the Lassen National Forest fire history records document a total of 452 fires ranging from 0.10 to 26,980 acres in size in and around the Creeks Project area; 323 of the fires were attributed to lightning and 129 were caused by humans (Table 3-19).

Table 3-19. Fires recorded in / around the Creeks Project Area (1911-2002) by cause / size class.

Determined Cause	Fire Cause And Size Class Distribution				
	A 0 - 0.1 Acres	B 0.1 - 10.0 Acres	C 10.1 – 99.9 Acres	D 100.0- 499.9 Acres	E 500+ Acres
Human	76	42	6	4	1
Lightning	257	65	1	0	0
Undetermined	0	0	0	0	0
Total Fires	333	107	7	4	1
Total Acres	31	107	339	857	26,980

Note: Geographic quadrangle of fire history study area spans from western border of R5E to eastern side of R6E and from a northern line of T27N to a southern border of T26N, MDBM. Source: Lassen National Forest fire history records.

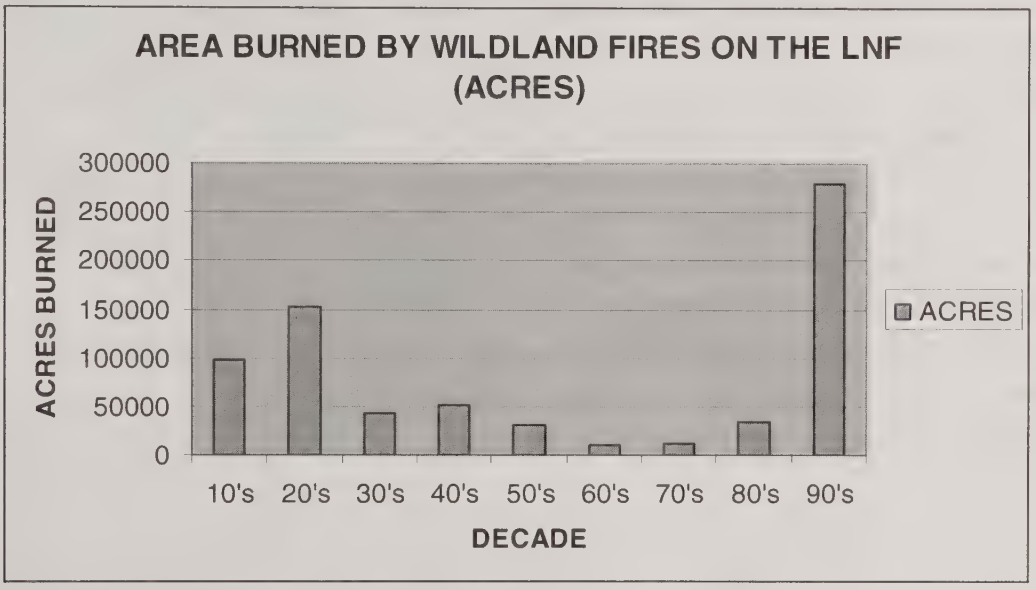
Table 3-19 shows that approximately 29 percent of the fire ignitions in the area throughout those years have been caused by human activities. However, the actual count of human caused ignitions is thought to be underrepresented based on information from veteran fire personnel that have worked on the Almanor Ranger District (Hennessey, 2004). There have been instances where small fires associated with abandoned campfires or mechanical activities were not documented. The area certainly has had more human caused ignitions than the records indicate. Five fires exceeding 100 acres have occurred in the project area since 1911.

The Storrie Fire (August and September, 2000) located to the south of and adjacent to the Creeks Project area demonstrated how fire would likely behave in vegetation types similar to Creeks under severe fire weather conditions. The vegetation communities in the Storrie Fire were similar in stand structure and species composition as Creeks. Some of these communities burned at moderate and high intensities and were severely damaged, with entire stands of trees killed as a direct result of fire-related injuries. An assumption is made that a fire in the Creeks Project area under current conditions and similar weather would experience moderate to high intensity fire.

Noticeable trends in the amount of acreage burned by decade on the Lassen National Forest are shown in Figure 3-9. From 1910 to 1929, an average of 12,503 acres burned/year for a total of 250,066 acres. During this period Federal and local firefighting forces were in the early stages of organization and development and were low to moderately effective in containing wildfires. From 1930 thru 1989, an average of 3,039 acres

burned/year consuming 182,344 acres on the Forest. As advances in firefighting technology, equipment, and organization occurred during this period, fighting fire became more efficient. These factors led to a remarkable downward shift in acres burned per year across the Forest during this time period. From 1990 to 1999, an average of 27,976 acres burned/year totaling 279,756 acres. The sharp rise in fire activity during this period on the Lassen National Forest is thought to be related to excessive buildup of fuels from 80+ years of fire suppression, despite further advances in firefighting technology and organizational development. By the 1990's the fire interval had reached a point far beyond historical/natural return (Lassen National Forest fire history records, USDA FS, 2002b).

Figure 3-9. Acres burned by wildland fires per decade, Lassen National Forest in the 20th Century.



Source: Lassen National Forest fire history records, 2002.

The fire return interval in the Creeks project area has changed remarkably since 1905.

The overall pre-1905 fire return interval was 28.2 years. In contrast, during the suppression period fire return interval for the area was 406 years (Beaty and Taylor, 2001). Fires occurring during settlement and pre-settlement periods occurred frequently and were low to moderate in severity. Low and moderate severity fires consume patches of fuel and kill mostly seedlings and saplings in the understory and occasionally small groups of main canopy trees (Kilgore and Taylor, 1979). This fire regime is purported to create a multi-aged forest with open and closed canopy conditions and heterogenous fuels, which impedes development of high severity fire and leads to a shifting mosaic of steady-state forest at the landscape level (Bonnicksen and Stone, 1982).

As shown in Figure 3-9 the fire risk within the project area has increased from relatively low in the 1960s and 1970s to one of moderate to high in the 1980s, 1990s. Recent ignitions are increasing due to the population growth in the Chester area, and increase in recreating publics to the Creeks Project area. This trend is likely to continue in to the near future.

Stand Structure/Composition

For purposes of estimating and describing fuel conditions in this analysis, forest stands within the Creeks Project area are described by California Wildlife Habitat Relationship (CWHR) vegetation class. CWHR classes are described in Table 3-2.

Condition Class

Figures 3-10, 3-11, and 3-12 are representative stands within the Creeks Project area. They show the three Condition Classes that have been developed to categorize the current condition of existing CWHR classes by Fire Regime (Laverty and Williams, 2000). Condition Class is defined in terms of departure from the historic fire regime. Condition Class is determined by the number of missed fire return intervals with respect to the historic fire return interval, and the current stand structure and tree species composition of any given strata. The relative risk of fire-caused losses of key ecosystem components that define each CWHR class increases for each respectively higher numbered Condition Class, with little or no risk at the Class 1 level.

Current conditions are a function of the degree of departure from historical fire regimes resulting in alteration of key ecosystem components such as species composition, structural stage, stand age, and canopy closure. One or more of the following activities may have caused this departure: fire suppression, timber harvesting, grazing, introduction and establishment of exotic plant species, insects or disease (introduced or native), or other past management activities.

Table 3-20 outlines CWHR classes by acres and describes the existing Condition Class and desired Condition Class in the proposed DFPZ units. Table 3-21 describes the existing Condition Class, desired Condition Class, for the proposed area thinning units.

In Tables 3-20 and 3-21, some CWHR Classes were grouped when describing Condition Classes. This was done to condense the table where strata types of similar structure and composition shared the same Condition Class. Existing Condition Class determinations were based on field observations. The tables show that most CWHR classes are currently not in a state of desired condition.

Figure 3-10. Condition Class 1 in Mixed Conifer and Red Fir within the Creeks Project Area



Source: Almanor Ranger District Creeks Project FEIS planning record.

Condition Class 1 - Mixed Conifer

Condition Class 1 - Red Fir

Condition Class 1: Fire regimes are within an historical range and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within an historical range. The photographs shown in Figure 3-10 are of stands within the project area that exhibit the characteristics of condition class 1 in the mixed conifer and red fir types. The mixed conifer stand was thinned to approximate crown closure of 40% in the late 1990s. Previously implemented vegetation management activities in the red fir stand were roadside hazard tree removal.

Figure 3-11. Condition Class 2 in Mixed Conifer and Red Fir within the Creeks Project Area



Condition Class 2 – Mixed Conifer



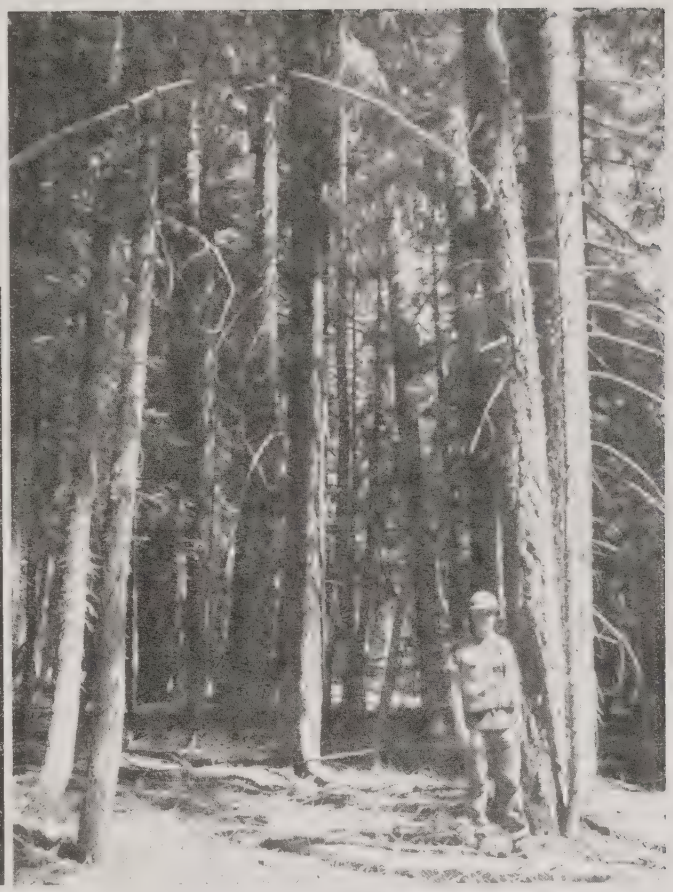
Condition Class 2 red fir

Condition Class 2 Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased). These result in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range. The photographs shown in Figure 3-11 are of stands within the project area that exhibit the characteristics of condition class 2 in the mixed conifer and red fir types. Treatments within the mixed conifer stand were a thin from below in the mid 1990s. The red fir stand received a intermediate sanitation treatment in the late 1990s.

Figure 3-12. Condition Class 3 in Mixed Conifer and True Fir within the Creeks Project Area



Condition Class 3 - Mixed Conifer



Condition Class 3 - True Fir

Condition Class 3: Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by return intervals (either increased or decreased). These result in dramatic changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range. The photographs shown in Figure 3-12 are of stands within the project area that exhibit the characteristics of condition class 3 in the mixed conifer and true fir types. Both of these stands have been unmanaged.

Table 3-20. Condition Class for the DFPZ units by CWHR class.

Forest Cover	CWHR Class	Acres	Condition Class	
			Existing	Desired
Mixed Conifer	1S	14	2	1
	2S	20	2	1
	3M	20	2	1
	3P	219	2	1
	3S	97	2	1
	4D	262	2 AND 3	1
	4M	1,376	2 AND 3	1
	4P	669	2	1
	4S	61	2	1
	5M	381	2	1
	5P	25	2	1
Ponderosa pine	2D	4	2	1
	2P	43	2	1
	2S	29	2	1
	3D	47	2 AND 3	1
	3M	19	2 AND 3	1
	3P	75	2	1
	4M	0	2 AND 3	1
	4P	4	2 AND 3	1
	4S	10	2	1
Red Fir	2S	16	2	1
	3D	62	2 AND 3	1
	3M	65	2 AND 3	1
	3S	9	2	1
	4D	76	2 AND 3	1
	4M	407	2 AND 3	1
	4P	15	2 AND 3	1
	4S	14	2	1
	5M	1	2 AND 3	1
	5P	1	2	1
White Fir	2M	1	2	1
	2S	67	2	1
	3P	188	2	1
	3S	254	2 AND 3	1
	4D	46	2	1
	4M	451	2 AND 3	1
	4P	525	2	1
	4S	184	2	1
	5M	25	2 AND 3	1
	5P	12	2	1
Brush/other	Brush	111	2 AND 3	1
TOTAL		5,905		

Source: Almanor Ranger District GIS (Vestra_veg)

Table 3-21. Condition Class for area thinning units by CWHR class.

Forest Cover	CWHR Class	Acres	Condition Class	
			Existing	Desired
Mixed Conifer	1S	13	2	1
	2S	19	2	1
	3M	38	2	1
	3P	38	2	1
	3S	48	2	1
	4D	244	2 and 3	1
	4M	1,107	2 and 3	1
	4P	214	2	1
	4S	2	2	1
	5M	10	2	1
Ponderosa pine	3M	9	2	1
	4P	0	2	1
Red Fir	2P	1	2	1
	2S	2	2	1
	3S	2	2	1
	3D	11	2 and 3	1
	3M	73	2 and 3	1
	4D	88	2 and 3	1
	4M	111	2 and 3	1
	4P	8	2	1
	5M	0	2 and 3	1
	5P	22	2	1
White Fir	2M	9	2	1
	2S	147	2	1
	3D	5	2 and 3	1
	3M	21	2 and 3	1
	3P	98	2	1
	3S	259	2	1
	4D	30	2 and 3	1
	4M	372	2 and 3	1
	4P	232	2 and 3	1
	5M	0	2 and 3	1
Brush/other	Brush	52	2 and 3	1
	TOTAL		3,285	

Source: Almanor Ranger District GIS (Vestra_veg)

Fire Weather

The Chester Remote Automated Weather Station (RAWS), located approximately 14 miles northeast of the project area, was selected to obtain 90th percentile weather for use in fire behavior modeling. The 90th percentile weather represents the "average worst" weather conditions for days when fires occur. These conditions would be in effect on 10 percent of all the days that large fires occur on the Almanor Ranger District. The 90th percentile fire weather indices were obtained from station recordings from 1980-1999. Table 3-22 displays the 90th percentile weather indices that were used for modeling fire behavior inside the Creeks Project area.

Table 3-22. 90th percentile fire weather data for Chester, California.

Fuel/Weather Variable	90th Percentile Values
1 Hour Fuel Moisture, %	3
10 Hour Fuel Moisture, %	5
100 Hour Fuel Moisture, %	7
1000 Hour Fuel Moisture, %	13
Herbaceous Fuel Moisture, %	33
Woody Fuel Moisture, %	60
20 Foot Wind Speed, MPH	11
Dry Bulb Temperature, Degrees F	90

Source: Chester Remote Automated Weather Station

The values listed in Table 3-22 are consistent with extreme fire weather. Fire behavior modeling was completed for both existing conditions and post treatments prescriptions A, B, and C. The most extreme end of atmospheric and fuel moisture conditions are normally used for fire behavior modeling in fuels planning. Fire behavior was modeled in six-selected CWHRs within the project area. The models were created using Fuels Management Analyst Plus (FMAPlus) (Carlton, 2001). The fuels and predicted fire behavior were modeled for each type of treatment, with the exception of group selection. Results from fire behavior modeling are shown in Tables 3-25 and 3-27.

Fire Hazard Assessment

Fire hazard identifies the availability of fuels to sustain a fire. Fire hazard for any particular forest stand or landscape reflects the potential magnitude of fire behavior and fire effects as a function of fuel conditions. Understanding the structure of fuels and their role in the initiation and propagation of fire is the key to developing effective fuel management strategies. Natural forest fuels which are the key components of rating fire hazard are generally described in three categories. Surface fuels, which are composed of grass, herbs, low-lying shrubs, litter, and dead and down woody material that are in contact with the ground fuels. Ladder fuels, which are composed of live and dead shrubs and understory trees, contact the lower crowns of overstory trees. Canopy fuels are the live and dead material in the canopy of trees (Petersen et al., 2003). With the exception of ground fuels, these fuel types are used in modeling fire behavior. The overall fire hazard for the Creeks Project area is high. In this analysis, fire behavior is described by flame length and rate of spread (Rothermel, 1983).

Fire behavior is the manner in which a fire reacts to available fuels, weather, and topography. A change in any of these components results in a change in fire behavior (DeBano et al., 1998). Fire behavior is complex, with many contributing factors; the most critical of which are topography (slope, aspect, elevation), weather (climate, air temperature, wind, relative humidity, atmospheric stability) and fuels (size, type, moisture content, total loading, arrangement) (Agee, 1993). Topography and weather at a given location are beyond the ability of management to control. Fuel hazard is the only controllable factor. Weather conditions such as drought, high temperature, low humidity, and high wind play a major role in the spread of wildfires and are influenced by topography and location of mountains as well as global influences such as La Niña and El Niño. Weather conditions are a major factor in the initiation and spread of all wildfires, but Omi and Martinson (2002) found that stands with prior fuel treatments experienced lower wildfire severity than untreated stands burning under the same weather and topographic conditions. Fuel management modifies fire behavior, ameliorates fire effects, and reduces fire suppression costs and danger (DeBano et al., 1998). Manipulating

fuels reduces fire intensity and severity, allowing firefighters and land managers more control of wildland fires by modifying fire behavior in the fire environment (Pollet and Omi, 2000).

Fuels management can include reducing the loading of available fuels, lowering fuel flammability, or isolating or breaking up large continuous bodies of fuels (DeBano, 1998). Fuels contribute to the rate of spread of a fire, intensity/flame length, fire residence time, and the size of the burned area (Agee et al., 2000). For these reasons, the comparison of alternatives in this analysis focuses on the reduction of important fuels, fire behavior indicators, and relative rating of fuel hazard within ½ mile of private property.

A wildfire hazard assessment should analyze crown fire potential as well as surface fire. Crown fires normally are highly destructive, difficult to control, and present the greatest safety hazard to firefighters and the public. Therefore, fuel management must emphasize the factors that contribute to the initiation and spread of crown fires. These factors include height of the forest canopy above the ground (crown base height), density of the crowns (crown bulk density), stand density, and basal area (Omi and Martinson, 2002). In general, crown fires burn hotter and result in more severe effects than surface fires. Crown fires generally spread at least two to four times faster than surface fires (Rothermel, 1983). Fires that spread quickly and at higher intensities can pose a greater risk to firefighters and the public when they occur. Agee (1996) states that crown fire potential can be managed through prevention of the conditions that initiate crown fires and allow crown fires to spread. Three main factors contributing to crown fire behavior can be addressed through fuels management: initial surface fire behavior, canopy base height, and canopy bulk density.

Existing Fuels Conditions

The majority of stands proposed for treatment are moderately to densely stocked, with crown closures greater that 40%. These stands are overstocked with poles and small trees (6 to 24 inches dbh), but generally understocked with medium and larger sized trees (24 inches dbh or larger). Shade tolerant species, predominantly white fir, have encroached around and under fire tolerant trees (Jeffrey pine and ponderosa pine) throughout the project area. This invasion has created hazardous ladder fuel conditions, greatly increasing the potential for fire to propagate into crowns of trees, leading to potential of crown fire spread.

Fine surface fuels are generally the primary carriers of fire. Fine surface fuels are course down woody material with diameters of 0.1 to 3.0 inches. These fuels are an important factor in determining how fast a surface fire will spread and how hot it will burn under given atmospheric and topographic conditions. Anderson (1982) identifies fine surface fuels as the primary carrier of fire at the flaming front. These fuels directly effect fire intensity and spread by linking fire from the surface and into the ladder fuels, which often leads to propagation of fire into the crowns of trees. Table 3-23 shows the estimated existing fuel loading (tons/acre) by CWHR class in four diameter size classes. These CWHR classes are a representative example of existing fuel conditions in the project area. These estimates were based on field observations and use of the Photo Series for Quantifying Natural Forest Residues: Southern Cascades, Northern Sierra Nevada (Blonski, 1981).

Table 3-23. Estimated loading of dead and down woody fuels by CWHR class (tons/acre).

		Dead and Down Woody Debris				
Forest Cover	CWHR Class	0-3" Fuels tons/acre	3-9" tons/acre	9-20" tons/acre	>20" tons/acre	Total Woody Fuels tons/acre
Mixed Conifer	3M	8.2	6.4	0	0	14.6
	4M	4.3	6.8	13.5	5	29.6
	4D	5.8	2.2	8.8	6.1	22.9
	5M	5.7	3.3	21.7	10.8	41.5
	5D	5.7	3.3	21.7	10.8	41.5
White Fir	3D	8.2	6.4	0	0	14.6
Red Fir	3M	8.2	6.4	0	0	14.6
	3D	8.2	6.4	0	0	14.6
	4M	4.6	5.3	7.5	0	17.4
	4D	4.6	5.3	7.5	0	17.4
	5M	5.7	3.3	21.7	10.8	41.5
	5D	5.2	2.2	23.8	0	31.2
Ponderosa Pine	P3M	3.7	5.5	0.7	0	9.9

Source: Field observations and use of the Photo Series for Quantifying Natural Forest Residues: Southern Cascades, Northern Sierra Nevada (Blonski, 1981)

Table 3-23 shows that fine surface fuels (0-3 inches) range from moderate (3.7 tons/acre) to extreme (8.2 tons/acre). Needle litter and downed woody material are the dominant fine fuels in all CWHR Classes. Total surface fuel loading is moderate to heavy, ranging from 10 to 42 tons per acre. Surface fuels greater than 3 inches contribute towards intensity, resistance to control and spotting, but are not used in the fire behavior-modeling algorithm. The photo series does not designate a 9 to 12 inch breakdown for fuel loading. Table 3-23 shows that current surface fuel loads range from 7.4 to 14.6 tons/acre in the 0 to 9 inch size class for those CWHR classes analyzed. The overall mass of the 0 to 9 inch size class is moderate to high for hazard condition.

Desired Fuels Conditions/Fire Behavior

The Proposed Action is to develop a DFPZ that links to the HFQLG DFPZ Pilot Project network. Area thinnings are designed to reinforce the DFPZ network in logical, designated areas. Both DFPZs and area thinnings would be effective in reducing the potential size and severity of wildfires, while providing fire suppression personnel safe locations for taking action against wildfire. Desired fuels conditions include reduction of ladder, crown, and surface fuels in order to lower the potential for crown fire and related stand mortality, while providing a DFPZ and area thinning. The DFPZ and area thinnings would open up the canopy and reduce the density of understory trees and surface fuels loads. Both treatments would alter stand structure and species composition, resulting in a fire environment that is less hazardous, while protecting people and natural resources. Post-treatment stands would more closely reflect Condition Class 1. Approximately 9,190 acres in both the DFPZ and the area thinning would be treated. Desired fuels conditions would be achieved by: 1) treating surface and small ladder fuels, raising canopy base height and reducing the potential for crown fire initiation and spotting; 2) thinning the canopy from below to decrease crown bulk density and reduce crown continuity; and 3) reduction of surface and residual activity slash using pile or broadcast burning. Reduction of

surface fuel loads would result in decreased rates-of-spread, smaller flame lengths, lower fireline intensities, and reduced tree mortality in the event of wildfire.

To meet desired conditions, surface fuels would be treated so that no more than 5 tons per acre of down woody material less than 12 inches diameter would exist following all treatments. Pile and underburning would be implemented to treat surface fuels where necessary following tree and brush removal. Up to 10 to 15 tons per acre of the largest down woody material would remain on site. The large down woody material is defined as logs greater than 12 inches diameter at the small end and a minimum of 6 feet in length. Tree stocking would be retained towards the lower end of full site capacity. Stand basal area would generally range from 150 to 200 ft2/acre. Canopy cover would generally average 30% to 50%. Understory trees less than six inches dbh would be relatively few and scattered, with no more than 50 per acre remaining.

Crown fire initiation and crown fire are related to several conditions that must be met. The intensity of surface fire must be relatively high, while foliar moisture content of the live vegetation is low. Crown base height (CBH) and crown bulk density (CBD) are two critical factors in predicting crown fire propagation and spread. CBH is the average height (feet) from the top of the surface fuel to the lowest part of a tree's crown at which there is a sufficient amount of crown fuel to propagate fire vertically into the canopy (Scott and Reinhardt, 2001). CBH incorporates ladder fuels such as shrubs and understory trees as well as the live and dead lower branches of mature trees. It is measured at the lowest height above ground where at least 0.010 kilograms per cubic meter (kg/m3) of available canopy fuels are present. The lower the crown base height, the easier it is for a given surface fire to initiate a crown fire. Low crown base height provides the "ladder" which allows a surface fire to become a crown fire. CBH across the project area currently ranges between 5 to 9 feet in the analyzed CWHR classes (Table 3-27). This range is considered as hazardous as tree crown bases are near the ground and are likely to be in contact with other existing vegetation (shrubs) and relatively close to surface fuels.

Crown bulk density is defined as the amount of available canopy fuel per unit canopy volume. Crown bulk density is the average mass (kg/m3) of tree crowns across a forest stand (Brown and Smith, 2000). It is a bulk property of a stand, not an individual tree, and is represented as the available canopy fuel load divided by canopy depth (Scott and Reinhardt, 2001). Thinning to reduce crown bulk density to less than 0.10 kg/m2 is generally recommended to minimize crown fire hazard when a fire moves into an area from an outside point source (Agee, 1996). For any given species, more widely spaced trees have a lower canopy bulk density, which makes it more difficult to maintain crown fires. CBD across the project area currently ranges between 0.11 to 0.30 kg/m3 in the analyzed CWHR classes (Table 3-20). This range is considered as moderate to high in hazard as masses range above 0.10 kg/m3.

In order for a crown fire to initiate, a surface fire must be intense enough to ignite the lowest level of branches that will propagate fire to the upper levels of the canopy. In order for the initiated crown fire to persist, the canopy must be dense enough for the fire to spread from one tree's branches to another tree. Once a fire gets into the crown of the trees, whether crown fire ignition is sustained or not is determined by surface fire rate of spread and crown bulk density (Alexander, 1988; Van Wagner, 1977). Stands with high CBDs can sustain a crown fire that initiated outside the stand, even when surface fire intensity and CBH are such that fires that start within the stand itself will not transition into a crown fire.

Environmental Effects

Alternative 1 - Proposed Action

Direct Effects

The effectiveness of treatments in modifying fire behavior was discussed in the 2004 SNFPA FSEIS, Chapter 3-5, pages 286 to 288, and the 1999 HFQLG FEIS, Section 3, pages 32 to 52. Additional discussion on the effectiveness and placement of fuel treatments across the landscape is discussed in the 2004 SNFPA FSEIS. The fuel treatments proposed in Alternative 1 would employ a combination of mechanical harvest, mastication, hand thinning, and prescribed fire treatments.

Direct Effects of Defensible Fuel Profile Zones

In developing DFPZs, mechanical harvest treatment would use low thinning, also known as "thinning from below," to remove ladder fuels in the suppressed and intermediate crown classes, which would reduce the vertical continuity between surface and canopy fuels (Peterson et al. 2005; Graham et al. 2004). Removal of saplings and pole-sized trees would reduce stand density, ladder fuels, and shade-tolerant species, while increasing canopy base height. This treatment would be effective in reducing torching, which would further reduce the potential for a surface fire to initiate into a crown fire (Peterson et al. 2005; Graham et al. 2004).

Fuel treatments also use crown thinning to remove co-dominant trees and, consequently, to reduce the horizontal continuity of canopy fuels (Peterson et al. 2005; Graham et al. 2004). The removal of co-dominant trees would reduce stand density, canopy bulk density, and interlocking crowns by increasing crown spacing between residual trees. Large fire-resilient dominant and co-dominant trees would be retained to maintain structural diversity and contribute to multistory canopy conditions. In addition, species preference for retention would be given to shade-intolerant trees with more fire-resistant characteristics, such as ponderosa pine, Jeffery pine, sugar pine, and Douglas-fir (Graham et al. 2004). This treatment may reduce the spread of crown fire (Peterson et al. 2005; Graham et al. 2004), and when combined with low thinning, may reduce torching.

Whole-tree yarding would be used in all action alternatives to treat slash generated by harvest activity. Removal of limbs and tops by such methods would greatly reduce activity-generated surface fuels (Agee and Skinner 2005). The majority of trees would be removed using whole-tree yarding, which would effectively reduce the potential for activity-generated fuel accumulation. The slash would be lopped and scattered to minimize fuel bed depth, continuity, and arrangement if whole-tree yarding is not feasible (such as when mechanical yarding of an individual large tree would result in excessive damage to a residual stand). The net effect may result in incidental activity-generated fuel accumulations; however, underburning, pile burning, or other appropriate surface fuel treatment method would be used, as needed, to reduce activity-generated fuels.

The low thinning that would occur during mechanical fuel treatments would reduce vertical continuity between the surface fuels and canopy fuels by removing the ladder fuels, which would reduce the potential for torching and crown fire initiation from surface fuels. However, by removing ladder fuels in the suppressed and intermediate crown classes, the treatment would effectively reduce structural diversity of the canopy on the stand level. The crown thinning would decrease horizontal continuity between canopy fuels by reducing canopy bulk density. This would provide for adequate spacing between crowns, which may inhibit the spread of crown fires. The net effect would be a reduction in conifer stocking and density, which would correspond with an increase in average tree spacing. The residual stand structure would be an open, single-canopy stand

comprised of large trees with relatively greater spacing between crowns. This would allow for a reduced overall fire hazard.

Direct Effects of Mastication within DFPZs

The mastication treatments would occur primarily in the montane chaparral community and in conifer stands where mechanical treatment is not viable. The mastication treatments would alter the vertical arrangement of brush fuels converting live aerial fuels into dead surface fuels. Vigorous conifer saplings and larger trees would be avoided during treatment to encourage the establishment of forest cover where site quality permits. The treatment would contribute to a deeper duff layer, which may inhibit the growth of grass and forb species. However, basal sprouting and seedling establishment is expected to contribute to the regeneration of immature stands of brush species. Concurrently, the duff layer would decline due to decomposition, eventually allowing establishment of understory vegetation.

Direct Effects of Hand Thinning within DFPZs

Hand thinning would occur in stands where mechanical harvest may be limited by steep slopes and/or resource concerns. Hand thinning would primarily occur in Riparian Habitat Conservation Areas (RHCA) to treat ladder fuels where mechanical treatment is not feasible. Hand thinning would raise the average crown base height and reduce crown bulk density.

Direct Effects of Prescribed Fire within DFPZs

Prescribed fire treatments would be used in stands that are not available for mechanical treatment and as a follow-up to surface fuel treatment in stands where mechanical harvest would occur. The prescribed fire treatment would reduce surface fuel loading by consuming duff, litter, and down woody debris. This treatment is likely to induce scorch on lower canopy residual trees and may cause incidental mortality in trees. However, on the stand level, prescribed fire would have a minimal effect on existing forest vegetation and structure. Prescribed fire would create a mosaic of conditions through ignition and microclimate variability, creating bare mineral soil in some areas and leaving vegetation intact in other areas. Where bare mineral soil is created and vegetation is killed, sprouting and regeneration would reinvigorate the understory plant community (Kauffman and Martin 1990).

Direct Effects of Area Thinning with Biomass Removal

Individual tree selection with removal of biomass would fully incorporate the concept of low thinning, where the vertical continuity between surface fuels and canopy fuels would be greatly reduced by the removal of smaller diameter ladder fuels in the form of biomass products. The removal of ladder fuels in the suppressed and intermediate crown classes would result in a greater reduction in structural diversity on the stand level where crown overlap is less likely to occur. Because this treatment would fully incorporate the concept of low thinning (thinning from below the canopy), the resulting stand structure would range from a single- to two-storied stand comprised of the largest dominant and co-dominant trees. Residual intermediate trees would be retained for structural diversity, and the most suppressed and intermediate trees would be removed. Diameter distribution would be more normal or bell shaped due to the removal of small trees. The overlap of tree crowns would be reduced, but tree crowns would provide more continuous cover. A mixture of dominant and co-dominant trees of species indicative of ecological habitat type would be retained with an emphasis on shade-intolerant species. Establishment and development of understory vegetation would primarily consist of shade-

tolerant species, while shade-intolerant species would be limited to openings in the canopy where sufficient light levels exist. Skid trails and landings may create such openings where light conditions and bare mineral soil would provide for the establishment and development of shade-intolerant or early seral species. The effect of treatment on understory vegetation is expected to be negligible because canopy cover would remain relatively high.

The direct effect on ladder fuels in both DFPZs and area thinnings is that ladder fuels would be reduced, thus increasing average CBH (Tables 3-18 and 3-20). The tables show that predicted average CBH in treated stands would generally increase to 12 to 38 feet after thinning. This is a more desirable ladder fuels condition. As the canopy base height is raised, the ability for fire to transition into crowns lessens, thus reducing mortality. This is a direct effect on the vegetation, but is an indirect effect on fuel conditions in regards to the fire environment. As canopy closure and CBD are correlated, both would be reduced upon completion of the proposed treatments. The existing average CBD in stands that were sampled and modeled for fire behavior generally range between 0.110 to 0.296 kg/m3 (Table 3-20). The post treatment average CBD in modeled stands would generally range between 0.040 to 0.167 kg/m3 (Table 3-18). This reduction would have the indirect effect of decreasing fire severity and the potential for crown initiation and spread.

Direct Effects of Group Selection

In group selection units, conifers under 30 inches dbh would be removed. Canopy cover and tree density would be dramatically reduced in order to create a high light environment, which would promote the establishment and development of shade-intolerant conifer regeneration and understory vegetation. Consequently, the treatment is expected to shift groups into CWHR size class 1 and 2 structures. Residual stand structure would be comprised of no more than approximately 10 trees per acre, all of which would be greater than 30 inches dbh. Group selection harvest units would be regenerated using a combination of naturally established and planted shade-intolerant species to achieve desired stocking levels. Group selection harvest units would be regenerated with desirable shade-intolerant species indicative of the ecological habitat type in which the group is located. Diameter distribution would be representative of a one- to two-aged stand depending on the presence of overstory trees greater than 30 inches dbh (Smith et al. 1997).

Establishment and development of competing shrubs, grasses, and forbs is expected, but it should be noted that group selection may also be used as a silvicultural technique to reduce the occurrence of competing brush species (McDonald and Fiddler 1993). McDonald and Reynolds (1999) observed that in smaller group selection openings, "normally aggressive shrub species were never really competitive," but also observed less successful development of shade-intolerant species such as ponderosa pine in smaller group selections. It is expected that the larger size of the group selection would contribute to a higher light environment where shade-intolerant conifer regeneration would successfully develop.

In Group selection units, surface fuels would be retained at no more than five tons/acre. Vertical and horizontal continuity of ladder fuels would be disparate, creating an environment of low fire behavior.

Direct Effects of Prescribed Fire

The tree and brush species that are present in the project area would be affected by prescribed fire in a variety of ways. The summary of these effects is described in Table 3-24 (Brown and Smith, 2000).

Table 3-24. Fire effects on vegetation from prescribed fire.

Ponderosa pine	Ponderosa pine is adapted to fire. It has thick bark, medium to large size buds, long needles, open crown structures, and becomes resistant to fire at the sapling to pole size. Burning would be conducted in this project area in the spring, early summer, and fall. There would be some scorching of the crowns resulting from the underburning of the stands. An effect of the scorching would be the pruning of the lower branches thus raising the crowns of the trees. This raising of the heights of the trees tree crowns would make it harder for crown fire initiation.
Douglas-fir	Douglas-fir can survive moderately intense fires. It has thick corky bark on the lower bole and roots that protect the cambium form damage. Seedlings and saplings are susceptible to and may be killed by even low-intensity ground fires.
Sugar Pine:	Mature sugar pine is very resistant to low to moderate severity fires. It has adapted a thick, fire resistant bark and open canopy that retards aerial fire spread. Young sugar pines are susceptible to low to high severity fires.
White fir	Sapling and pole size white fir are sensitive to fire due to the thin bark, low growing branches, and shallow roots. As the trees mature, the bark becomes thicker and is able to resist fire.
Incense-Cedar	Seedlings and sapling size incense-cedar are readily killed by fire. In studies conducted in northern California a low severity fire killed nearly all seedlings and saplings. Mature incense cedar's thick bark offers sufficient protection from excessive heat. Most studies find that only a high intensity surface fire would kill an occasional mature incense cedar.
Red Fir	Seedlings of red fir are easily killed by fire. Low intensity fires kill seedlings and saplings of red fir. The bark of older red fir is thick and fire resistant. The needles and branch tips are resistant to fire. Larger California red fir is able to withstand low severity fire but area killed by high severity fires.
Black Oak	California black oak has adapted to fire by sprouting from the root crown. Further fire adaptations include an extensive root system capable of supporting vigorous sprouting, and seedbed requirements (mineral soil or light duff) matching those produced by light- or moderate-severity fire.
Lodgepole Pine	Lodgepole pine is usually killed by fire due to its thin bark and shallow root system. Lodgepole pine burns in a stand replacement manner and following fire becomes established in even-aged stands.
Greenleaf Manzanita	Greenleaf Manzanita is adapted to fire. It has volatile oils in its leaves, low moisture in its leaves in the summer, and persistence of dead branches and stems. Sprouting from the root burl follows burning of the plant. In some areas, sprouting occurs from seed source in the soil after scarification has occurred.
Ceanothus	Ceanothus species are adapted to fire. Seeds retain their viability for several years and following a fire to scarify the seeds, they would sprout. The plant also has the ability to sprout from the root crown, if there is no damage to the root crown from fire.

Source: Brown and Smith, 2000

All species listed in Table 3-24 would be subject to prescribed fire within the Creeks Project area. The table demonstrates that underburning would result in some mortality of white fir, incense cedar, and Douglas-fir seedlings. The low intensity ground fire would also result in some mortality of sugar pine seedlings/sapling. Fire would prune trees, thereby raising the crown base height. Prescribed fire would also reduce surface and ladder fuels. Machine and hand pile burning would not have the same effects on vegetation as underburning. The raising of the heights of the crowns would not occur from pile burning. There could be some scorching of low branches due to heat and flames from burning piles, but this would occur only in isolated patches.

Direct Effects to Air Quality

The project area lies within the both the Plumas County Northern Sierra Air Quality Management District (NSAQMD) and the Butte County Air Pollution Control District (ACPD). As a matter of regional policy, a smoke management plan would be submitted to and approved by involved agencies prior to any burning that would occur within the Creeks Project area. Several communities lie within proximity of the areas where both

pile and prescribed burning is proposed to occur. Adherence to the smoke management plan for pile and understory burning would alleviate negative impacts to communities. By adhering to a smoke management plan approved by the Lassen National Forest Supervisor and the NSAQMD, particulate matter emissions from pile or understory burning would not violate California Ambient Air Quality (CAAQ) emission standards. Short duration production of smoke and associated emissions would occur during pile and understory burning.

Fugitive dust could result from logging operations such as skidding and hauling during dry seasons. Contractual requirements for standard road watering procedure would mitigate much of the problem. There could also be fugitive dust from local residents recreating in the project area for firewood cutting and hunting.

Indirect Effects

DFPZ and area thinnings would result in reduced aerial and surface fuel loads. The indirect effect would be to reduce hazardous wildland fire behavior from fires both originating within treatments and from outside point sources (Graham et al., 1999). Treatment of surface, ladder, and canopy fuels would further help protect communities and resources in and around the DFPZs and area thinnings, while increasing safety for firefighters. Direct wildfire attack and fire line production rates would improve. These changes would, in turn, lower the potential of large-scale events. Development of DFPZs and area thinnings would also increase the likelihood that prescribed fire could be used for vegetation management inside the DFPZ in the future. Because wildfires would become more manageable, associated smoke would be less intense and would produce lower particulate emission mass in shorter durations, when compared to the larger and more intense fires that would occur under current conditions.

Indirect Effects of Defensible Fuel Profile Zones

In the mechanical harvest treatments, canopy cover is expected to increase with residual stand growth. A reduction in stocking and density to enhance individual tree growth would contribute to the development of stands into subsequent CWHR size classes. Size class and canopy cover alone may not reflect attributes of suitable habitat associated with CWHR class because the reduction in structural diversity on the stand level due to the removal of suppressed and intermediate crown classes would persist. Group selection in fuel treatments may create isolated areas where fuel ladders exist; however, such structure would contribute to structural diversity and promote regeneration of shade-intolerant species.

The residual stand structure would range from an open to moderately dense canopy stand comprised of large trees in CWHR size classes 4 and 5; however, canopy cover would increase. The larger range in canopy cover may provide more versatility in reaching diverse site-specific desired conditions, and the lower limits of the range would improve the long-term effectiveness of treatment in maintaining lower canopy cover.

Development of understory vegetation and tree regeneration is largely dependent on light environment and the existing or adjacent stand characteristics mentioned above. Although canopy cover increases with growth after treatment, cover is expected to be less than that of pre-treatment conditions following treatment. This indicates that a higher light environment would persist in stands where canopy is reduced to 35 percent. This would maintain the growth of shade-intolerant understory vegetation. In stands where canopy would be reduced to 40-45 percent, a lower light environment would persist, which would promote the development of shade-tolerant understory vegetation. The stands where canopy cover would be reduced to 35 percent could sustain a continuous cover of understory vegetation relative to stands retaining 40-45 percent canopy cover,

which may exhibit patchy or discontinuous cover of understory vegetation. This range would contribute to spatial heterogeneity (diversity of species) of understory structure and development.

Indirect Effects of Area Thinning

The individual tree selection treatment may be described as a combination of low ("thinning from below") and crown thinning (Smith et al. 1997) where individual trees are selected for removal in order to meet forest health objectives while maintaining forest composition and structure. The forest health objectives are designed to improve vigor of residual trees by reducing stand density and competition and capturing mortality and diseased/dying individuals. The largest, most vigorous dominant and co-dominant trees would be retained to create a residual stand that would be comprised of larger fire-resilient trees. Species preference would be given to trees with more fire-resistant characteristics, such as ponderosa pine and Douglas-fir (Graham et al. 2004). Crown thinning is expected to have minimal to moderate effectiveness in reducing canopy bulk density and continuity because the ladder fuels and vertical continuity between surface and canopy fuels would remain intact (Peterson et al. 2003, 2005). Low thinning would reduce continuity of ladder fuels and canopy fuels by removing suppressed and intermediate trees; however, the effectiveness of such treatment may be limited by the lower diameter limit of 10 inches in units where biomass would not be removed. Consequently, stands with a minimal biomass component would receive priority for individual tree selection treatment without biomass removal.

Helms (1998) describes individual tree selection as a method in which "individual trees of all sizes are removed more or less uniformly throughout the stand to promote growth of remaining trees and to provide space for regeneration." However, in the Creeks Project area, individual tree selection would be used as an intermediary thinning of the area around group selections to reduce stand density and improve forest growth and health. The dominant and co-dominant trees would receive preference for retention. This would shift the focus to suppressed and intermediate trees for removal, resulting in a combination of low and crown thinning. Group selection would be used for meeting regeneration objectives because individual tree selection may favor shade-tolerant species when used as a regeneration method. The combination of individual tree selection and group selection harvest methods would strive to emulate gap dynamics of an uneven-age forest system. This system focuses on maintaining forest structure while providing openings that encourage regeneration of shade-intolerant species, and it may be effective in enhancing structural and compositional diversity, which contributes to the ecological health of the forest. All mechanical harvest operations, including tractor and cable-based logging systems, would adhere to standards and guidelines set forth in the timber sale administration handbook (FSH 2409.15, including Region 5 supplements) and the Best Management Practices as delineated in "Water Quality Management for Forest System Lands in California: Best Management Practices" (USDA 2000).

Whole-tree yarding would be used in all action alternatives to treat slash generated by harvest activity. Removal of limbs and tops by such methods would greatly reduce activity-generated surface fuels (Agee and Skinner 2005). The majority of trees would be removed using whole-tree yarding, which would effectively reduce the potential for activity-generated fuel accumulation. The slash would be lopped and scattered to minimize fuel bed depth, continuity, and arrangement if whole-tree yarding is not feasible (for example, when mechanical yarding of an individual large tree would result in excessive damage to residual stand). The net effect may result in incidental activity-generated fuel accumulations; however, underburning, pile burning, or

other appropriate surface fuel treatment method would be used to reduce activity-generated fuels as Standard Management Requirements and Monitoring Plan. Individual tree selection harvests would be designed to retain forest structure, composition, and canopy cover. The treatments are expected to maintain CWHR classification with a temporal reduction in canopy cover to the moderate classification.

Both treatments would reduce inter-tree competition, thus providing for individual tree growth. The removal of biomass would alter the structural diversity of the canopy by reducing smaller diameter ladder fuels and crown overlap, yet still provide for canopy cover retention. The retention of 40-50 percent canopy cover would maintain a moderate to low light environment where understory development would largely be limited to shade-tolerant species; however, establishment and development of shade-intolerant species may occur in naturally occurring gaps, skid trails, landings, and forest edges adjacent to group selections. A diffuse light environment would, however, be maintained on the stand level.

The spatial coordination of group selection and individual tree selection harvest may be a very appropriate tool when emulating uneven-aged forest development. The combination of the treatments would maintain forest structure, composition, and canopy cover while providing for openings, which would promote the establishment and development of shade-intolerant species. The reverse J-shaped diameter distribution would be maintained where individual tree selection would be used in conjunction with group selection.

Indirect Effects of Mastication

In mastication treatments, brush species are expected to regenerate and develop into mature stands. Conifers would not be subjected to mastication treatments and would increase forest cover where site quality permits. Mastication treatments are not expected to enhance development of stands into subsequent CWHR size classes.

Indirect Effects of Group Selection

As conifer regeneration in group selection units grows, these groups are expected to develop into subsequent CWHR size and cover classes. Within 50 years of treatment, groups would be expected to develop into a pole structure with moderate canopy (CWHR 3M). Groups with residual overstory trees greater than 30 inches dbh would be two storied and two aged. Crowns would generally be co-dominant, but may begin to differentiate into dominant and intermediate crown classes. Consequently, diameter distributions within such aggregations would be relatively normal (approximating the bell shaped curve) and the canopy would be relatively contiguous.

Development into subsequent CWHR size and cover classes would be largely dependent on seedling survival and competition with brush, grass, and forb species. Competing vegetation components are expected to persist until conifer canopy closure is sufficient to limit the understory light environment. Mortality of competing vegetation may begin to occur at the CWHR class 3M stage, as it is expected that pole-size trees would develop crowns above competing vegetation. Timber stand improvement activities in the form of mechanical maintenance (brush reduction and pre-commercial thinning) would have a positive effect on development of forest structure in group selections.

The openings in the forest canopy created by group selection units would promote the regeneration of an additional cohort of shade-intolerant, fire-adapted species. The net result across the landscape would be a mosaic of cohort aggregations, which would contribute to diversity in forest composition and structure.

Group selection units would provide for small open areas inside of and around DFPZs and area thins that would provide areas conducive to regeneration of fire-resistant and shade-intolerant ponderosa pine.

Indirect Effects of Prescribed Fire and Pile Burning

Handpile burning may induce crown and cambium (living tissue underneath the bark) scorch on nearby residual trees, and may cause incidental mortality dependent on such damage; however, incurred mortality as a result of handpile burning would be negligible. Understory vegetation would not be affected, with the exception of localized areas where duff and litter would be consumed during handpile burning. Even in these localized areas, the understory vegetation would regenerate, and the effects would be short term. Prescribed fire treatments may result in mortality of individual or isolated pockets of trees; however, this effect is expected to be incidental on the stand level. Establishment of understory vegetation may be dependent on consumption of the surface fuels (primarily the duff and litter layers), canopy cover, and stand characteristics mentioned above. However, low-intensity prescribed fire is not expected to create large shifts in forest species composition and structure.

Indirect Effects to Air Quality

Treatment of fuels under the Proposed Action would result in decreased smoke production and associated emissions in the event of a wild fire. This decrease would result in improved conditions for nuisance and associated health of humans in nearby communities. Short duration of smoke and associated particulate matter with existing emissions into the atmosphere from other vegetation burning on public and private land is expected. Fugitive dust could result from logging operations such as skidding and hauling during dry seasons.

Fire Effects with Modeling

Selected Proposed Action treatments were modeled for fire behavior, CBH, CBD, and fire effects on stand composition and structure using the Forest Vegetation Simulator (FVS), the Fire and Fuels Extension (FFE) to FVS, and Fuels Management Analyst Plus (FMAPlus). Modeling for fire behavior, CBH, and CBD was done on six selected CWHR classes that are representative of forest types that would be subject to treatment in the Creeks Project area. Modeling parameters are those described in Table 3-22 under 90th percentile fire weather. Modeling for fire effects on stand composition and structure used a different set of fire weather parameters that represent common conditions in the project area during summer months, but are less than 90th percentile conditions. Modeling for fire behavior is presented first, and then followed by modeling for fire effects on stand composition and structure.

Fire Behavior in Modeling

Fire behavior, CBH, and CBD were modeled for treatments A, B, and C under the Proposed Action alternative and are shown in Table 3-25. Modeled stands are post-treatment and are in Condition Class 1. Treatments F, G, and H were not modeled but fire behavior results would be similar. Modeling was also done for the No Action Alternative and results are described in that section.

Table 3-25. Predicted wildfire behavior in DFPZ (treatments A, B, C) under extreme fire weather conditions.

CWHR Class	Flame Length (feet)	Rate of Spread	Crown Base Height (feet)	Canopy Bulk Density Kg/m3
Treatment A				
2D	3.6	5.2ch/hr	16	0.139
2M	3.6	5.2ch/hr	28	0.167
3D	3.6	5.2ch/hr	34	0.122
3M	3.6	5.2ch/hr	26	0.111
4D	3.9	6.3ch/hr	22	0.040
4M	3.9	6.3ch/hr	12	0.150
Treatment B				
2D	3.6	5.2ch/hr	26	0.136
2M	3.6	5.2ch/hr	30	0.146
3D	3.6	5.2ch/hr	38	0.093
3M	3.6	5.2ch/hr	27	0.093
4D	3.9	6.3ch/hr	22	0.040
4M	3.9	6.3ch/hr	12	0.150
Treatment C				
2D	3.6	5.2ch/hr	24	0.099
2M	3.6	5.2ch/hr	20	0.081
3D	3.9	6.3ch/hr	19	0.077
3M	3.9	6.3ch/hr	26	0.100
4D	3.9	6.3ch/hr	22	0.040
4M	3.9	6.3ch/hr	12	0.150

Source: Almanor Ranger District; FVS and FMAPlus output files

Flame length is the average distance (feet) from the fire's surface to the top of a flame. The rule, developed by the National Wildfire Coordinating Group (NWCG), is that once flame lengths exceed 4 feet, firefighters on the ground would not directly attack fire. Under 90th percentile weather conditions, wildfire coming from an outside point or initiating in treatments A, B, and C would result in flame lengths ranging from 3.6 to 3.9 feet (Table 3-18). Flame lengths of four feet or less can be directly attacked by hand crews and engines, allowing faster fireline construction and generally resulting in smaller fire size. Rate of spread (chains/hour) is a measurement of how fast a fire is moving at the head. A chain length is 66 feet. Table 3-25 shows that the predicted rates of wildfire spread under extreme weather conditions range from 5.2 to 6.3 ch/hr, which is relatively slow for managing wildfire. Average CBH ranges from 12 to 38. The lowest CBH of 12 feet (4N) is considered to be relatively high from a fire management perspective. Table 3-25 shows a CBD range of 0.04 to 0.167, which is lower than or approximating the 0.10 kg/m3 CBD threshold for predicting crown fire initiation (Agee, 1996). This is also a benefit from a fire management perspective.

The results of predicted fire behavior, shown in Table 3-25, demonstrate that reduction of surface fuels moderates surface fire behavior. The representative sample of CWHR classes that were modeled for pre-treatment fire behavior covers 42% of the DFPZ area (2,492 acres). Generally, predicted flame lengths went from approximately 6.4 feet (Table 3-27) in the untreated stands to 3.9 feet following treatment (Table 3-25). Reducing the surface fuels also reduces the fire from passive crowning to surface fires in many of the stands. The reduction in rate of spread means that the fire in the treated areas would be smaller when crews arrive and would be moving slower, making it easier to contain with fewer fire crews. Thinning of the stands followed by fuels treatment would result in a microclimate change that would encourage the growth of grasses, forbs and

brush. Underburning would also encourage this growth. This microclimate change could also increase the drying of the surface fuels. This growth of grasses, forbs and some brush in the event of a wildfire would result in a low intensity surface fire. The majority of the vegetation in the mixed conifer ecosystem would survive a low intensity fire. In some cases, enough grass could grow into the stand to change the fuel model to one with more fine fuels. A grass fire would have a moderate to high rate of spread. Low intensity fires would result in low resistance to control, allowing fire fighters to directly attack the fire.

Fire Effects on Stand Composition and Structure in Modeling

Composition identifies the tree species present and the proportional representation of each in any given forest stand. Structure describes canopy classes present and the proportional representation of each in any given forest stand. Fuels treatments similar to the Proposed Action have proven to be successful in modifying fire behavior. A good example is the Cone Fire, which started on September 26, 2002 and burned 1,600 acres within the Blacks Mountain Experimental Forest inside the Lassen National Forest. When the Cone Fire started, fuel moisture and weather conditions were at levels expected to produce extreme fire behavior. Prior to the Cone Fire, twelve stands, comprising 3,192 acres within the Blacks Mountain Experimental Forest were thinned from below. Following the fire, stand data was collected on both treated and non-treated units where fire had occurred. The objectives for the data collection and analysis were to, 1) quantify the differences in fire severity between the treated and non-treated areas, and 2) evaluate the effectiveness of the treatments and their potential use for future fuel reduction projects on the Forest, such as DFPZs. The thinned areas survived with an estimated 20% mortality, while the unthinned area experienced 100% mortality. These areas were all on the same aspect and slope (Hood and Vazquez, 2003).

Other evidence exists that support the effectiveness of open stands with fewer trees as being the most desirable result of effective fuel treatment. Graham and McCaffrey (2003) documented the effects of the Hayman Fire (Colorado, June 2002) on stands that were thinned from below. The results were very similar to that reported with the Cone Fire thinning. Tree density reduction resulted in an easily suppressed surface fire when the Hayman Fire burned into treated stands. Even though thinning opens up stands to greater solar radiation and wind movement, resulting in warmer temperatures and drier fuels which enhance surface fire to spread, thinning does make surface fires easier to control.

The Storrie Fire (August and September, 2000) located to the south of and adjacent to the Creeks Project area demonstrated how fire would likely behave in vegetation types similar to Creeks under severe fire weather conditions. The vegetation communities in the Storrie Fire were similar in stand structure and species composition as Creeks. Some of these communities burned at moderate and high intensities and were severely damaged, with entire stands of trees killed as a direct result of fire-related injuries. An assumption is made that a fire in the Creeks Project area under current conditions and similar weather would experience moderate to high intensity fire.

A simulated wildfire was modeled to estimate potential wildfire effects on stand structure and composition in a DFPZ thinned stand. The Fire and Fuels (FFE) extension to the Forest Vegetation Simulator (FVS) was used for modeling. This model was used to observe how stand structure and species composition would change following fire under moderate fuel moisture and moderate atmospheric conditions. The algorithms used for both FFE and the Fuels Management Analyst Plus (FMAPlus) to predict fire behavior is the same. FMAPlus was used to analyze fire behavior under extreme "worst case" fire weather and moisture conditions

to predict fire behavior as a show of potential hazard for firefighters and natural resources under those conditions. The FFE modeled stand is a mixed conifer stand (4M) and is described in the Silvicultural Resources section of this document under the discussion of direct effects, for both pre-treatment and post-treatment conditions. Conditions for the simulated fire were windspeeds of 15 MPH at 20 feet from ground level, an air temperature of 85 degrees Fahrenheit and fuel moistures typed as "very dry". These are common conditions in the project area during hot summer months but are less than 90th percentile conditions which represent the upper bounds of typical hot summer burning conditions. Table 3-26 lists the percent fuels moisture projected for each fuel class.

Table 3-26. Fuel moistures used in a simulated wildfire.

Fuel Size Class	% Moisture (by weight)
0 – 0.25" (1 hour)	3
0.25 – 1.0" (10 hour)	4
1.0 – 3.0" (100 hour)	5
>3.0" (1000+ hour)	10
Duff	15
Live Fuels	70

Source: Almanor Ranger District weather data

A simulated wildfire was modeled for year 2005 immediately after thinning and prescribed burning treatments, and in year 2025. The simulated fire in 2005 killed approximately 17 square feet (9%) of stand basal area, predominantly in smaller trees. Approximately 70% of the trees killed were under 5 inches dbh and roughly 9% or 6 trees per acre were 10 inches dbh or larger. There was no mortality projected in trees greater than 30 inches dbh. The simulated wildfire did not appreciably alter overstory structure or canopy closure; however, it did project mortality in all seedlings and saplings.

Mortality from a simulated wildfire in year 2025 was dependent on the amount of regeneration established in the stand. With a moderate level of regeneration (94 trees per acre 2 inches dbh or less), approximately 9 square feet (5%) of stand basal area was killed by the simulated wildfire. Most trees killed (91%) were 5 inches dbh or less. With a relatively dense understory (162 trees per acre, 2 inches dbh or less), a simulated wildfire in the stand projected almost complete stand mortality. The increased density of small diameter trees was sufficient to cause extensive torching into the stand overstory. DFPZ maintenance, which would likely occur within 20 years of initial treatment, was not included in the wildfire modeling. With maintenance, expected wildfire mortality would be very low, similar to the first projection of less dense regeneration. These results suggest that fires would generally burn as surface fires through thinned stands, with increased likelihood of torching as stand understory and canopy cover grows increasingly dense. With maintenance, thinned stands would remain fairly open and dominated by large fire tolerant overstory trees. Understory regeneration would be fairly sparse and scattered.

Wildfire was not simulated in stands that have only group selection cutting without DFPZ or area thinning. Modeling can project group selection cutting and non-treatment of stands; however, it cannot project both treatments concurrently in the same stand. Wildfires would most likely burn as ground fires in these stands, with areas of torching. Under dense conditions, torching could be fairly extensive; however, fire would drop back to the ground when it came to openings created by group selections.

Group selection units are not a fuels treatment designed to meet the need of hazardous fuels reduction. The group selection units are small enough in size that a high intensity wildland fire would either burn around them or spot across them. The group selection units would have little to no effect on an approaching crown fire. Due to the small size of the group selection units they would not be a safe location to place firefighters in front of an approaching moderate to high intensity wildfire. In most cases, group selection units would have lower levels of surface fuels following treatment. Canopy fuels would also be lower, but would not have an affect on fire behavior at the landscape level. Pile and broadcast burning would occur in some group selection units.

Air Quality in Modeling

The resulting treatment of fuels under the Proposed Action would decrease smoke production and associated emissions in the event of a wildfire. This decrease would improve conditions for nuisance and associated health issues for humans. Short duration addition of smoke and particulate matter to existing emissions in the atmosphere from other vegetation burning on public and private land is expected.

Cumulative Effects

The cumulative effects analysis area for the Creeks Project includes ten subwatersheds. Figure A-9 displays this area (Appendix A). Those sub-watersheds are; Fanani, Grizzly Creek, Humbug Valley, Lemm Hollow, Marian Creek, Ruffa, Shanghai Creek, Soda Creek, Soldier Creek, and Upper Yellow Creek. The watershed boundaries make a logical perimeter for the area of analysis because they contain the project and generally exclude effects from outside sources. The exception would be wildland fire moving into the analysis area from an outside point source. Generally fires slow when burning into ridgetops which often mark watershed boundaries. These boundaries are a good place to take a stand in fighting wildfire either by aerial attack, indirect line, and/or backfiring. The average fires on the Almanor District tend to burn as small fires. Very seldom do fires in the Creeks analysis area cross watershed boundaries. That occurrence would be under extreme fire conditions. Within the Creeks area, fires tend to run from the south-west, and towards the north and east. The western portion of the boundaries is along the ridgetop because the likelihood of a fire crossing over the ridgetop would only occur within extreme fire conditions and would be rare in theory.

The fuel treatments, individual tree selection, and group selection, as proposed under Alternative 1, would create inherently different stand level effects. These differences in stand level effects would contribute to a landscape-level diversity by creating different stand structures with regard to stand densities, canopy structure, distribution of size classes, and age classes. The diversity in forest structure and composition created by these treatments and their spatial arrangement across the landscape may greatly reduce the growth of large fires (Graham et al. 2004). This diversity would also contribute to the creation of an uneven-aged, multistory, fire-resilient landscape, which may enhance ecological health of the forest while providing a timber supply that contributes to the economic stability of the surrounding rural communities.

The fuel treatments would create a relatively open forest structure where fuel amounts and arrangements have been altered to encourage low-intensity surface fires, which may be effectively suppressed by fire management personnel. The intensity and frequency of fuel treatment maintenance activities may have an inherent effect on the establishment and development of understory vegetation and tree regeneration. This, in turn, would retain stand structure and composition and would influence the long-term effectiveness in fuel treatments in terms of understory establishment and development.

Individual tree selection removal would maintain continuous forest cover, where horizontal and vertical structure would be retained on the stand level thus contributing to landscape level structural diversity. Group selection, however, would create aggregations of an additional cohort of shade-intolerant species characterized by single canopies and more normal (bell-shaped) diameter distributions.

The individual tree selection and group selection treatments, when applied together, would maintain forest cover and structure across the landscape, yet provide for openings that would promote the regeneration of shade-intolerant species. The inherently different forest structures that would be created by each treatment would contribute to structural diversity across the analysis area.

The cumulative effect of these treatments would be an increase in the capacity to manage forest health and fire potential but would be tempered by its relative proportion of the landscape.

The areas outside of the Creeks Project area and within the affected sub-watersheds include Forest Service managed lands, privately owned timber company lands, utility company lands, or other privately owned lands where past and present actions have occurred, and foreseeable actions are planned. Past, present, and foreseeable actions in the project area are listed in Appendix A. These actions and cumulative effects are discussed in the following paragraphs.

Past Actions

A list of Past Vegetative Management actions in the analysis area over the past twenty years is listed in Appendix A, Table A-1. The existing fuels conditions and resulting predicted fire behavior are the result of past management treatments that include logging, fuelwood harvest, wildfire, grazing, fire suppression, and tree planting. Various timber harvest and vegetation management projects have occurred throughout the project area and have included DFPZ development, timber sales, fire restoration, and habitat improvement. Under these activities, there has been a range of fuel treatment levels applied to these stands, including surface, ladder, and canopy treatments. Without periodic maintenance, even areas that were treated extensively have and will continue to accumulate canopy and surface fuels.

The past actions described in Table A-1 have had variable effects on current surface and aerial fuel conditions, based on the type of past treatment. Those treatments have helped shaped the current fuel/fire environment within the analysis area. Where individual tree selection had occurred (overstory removal, thin from above, shelterwood), dominant and co-dominant trees were harvested, leaving mostly suppressed and intermediate trees. Generally these trees were bucked and limbed on site and the saw logs were skidded out. Slash debris was usually not treated and left on site, greatly increasing the surface fuel loads that currently still exist where those types of harvests took place. Ladder fuels and crown bulk density within these treatment units were not changed appreciably from a fire/fuels perspective and remain in Condition Classes 2 and 3. The cumulative effect is that the proposed action would create conditions where those treatment areas are less vulnerable to fire from an outside source. Conversely, fire that originates within those stands would become less resistant to control when moving into the proposed action treatment areas.

Where clear cutting was done, the sites were prepped by burning all the slash, then planting tightly-spaced shade-intolerant trees. Currently these sites feature little surface fuels. Where these sites exist within the analysis area, the survival rate is relatively high, with canopies approaching closure and low crown base heights, on average. The risk for fire moving into these plantations is moderate, but potential for crown fire is high under moderate to extreme fire weather. The cumulative effect is that the proposed action would create

conditions where those plantations are less vulnerable to fire from an outside source. Conversely, fire that originates within those stands would become less resistant to control when moving into the proposed action treatment areas.

More recent past actions for timber harvest and fuel treatment have focused on low thinning (thinning from below), where method of harvest is by whole tree removal of understory trees, leaving minimal slash. Where slash exceeded levels above Condition Class 1, pile burning was used to decrease residual slash. The results include a pronounced decrease in surface fuels, ladder fuels and crown bulk density. These treatments generally result in stands being converted from Condition Classes 2 and 3 into Condition Class 1. The cumulative effect is that those areas where low thinning was accomplished would compliment the proposed action, as the overall acreage of Condition Class 1 would increase.

Four small grazing allotments have been active over the past 30 years in the analysis area. Only one of those still remains active, supporting 40 cows plus their calves. Past grazing has resulted in lower surface fuels where the livestock tended to concentrate. The timbered areas in the allotments, where the livestock tend to remain are in Condition Classes 2 and 3. The cumulative effect of the proposed action is that those grazing allotments would be more protected from wildland fire moving in. Conversely, fire that originates within those stands would become less resistant to control when moving into the proposed action treatment areas.

Private lands within the analysis area consist mostly of timber company holdings. Within the past 20 years, harvests on these lands have consisted of clear cuts and individual tree selection.

Where clear cutting was done, the sites were prepped by burning all the slash, then planting tightly-spaced, shade-intolerant trees. Currently these sites feature little surface fuels. Where these sites exist within the analysis area, the survival rate is relatively high, with canopies approaching closure and low crown base heights, on average. The risk for fire moving into these plantations is moderate, and the potential for crown fire is moderate under moderate to extreme fire weather. The cumulative effect is that the proposed action would create conditions where those plantations are less vulnerable to fire from an outside source. Conversely, fire that originates within those stands would become less resistant to control when moving into the proposed action treatment areas.

Where individual tree selection had occurred on private lands (overstory removal, thin from above, shelterwood), mostly dominant and co-dominant trees were harvested, leaving mostly suppressed and intermediate trees. Following harvest, slash is usually removed through pile burning or biomass removal. The cumulative effect is that the proposed action would create conditions where those treatment areas outside of the proposed action are less vulnerable to fire from an outside source. Conversely, fire that originates within those stands would become less resistant to control when moving into the proposed action treatment areas.

The Storrie Fire of 2000, which burned into the southern edge of the Creeks Project, produced moderate to severe fire behavior. Portions where high mortality occurred were salvaged, site prepped, and replanted with shade intolerant trees. Currently these plantations are experiencing high rates of survival and would likely not burn from an outside point source fire. Portions of the Storrie fire that were not salvage have accumulated a moderate amount of surface fuels over the past five years from mortality trees that have been deteriorating. The cumulative effect is that the proposed action would create conditions where plantations and untreated burned stands in the Storrie Fire are less vulnerable to fire from an outside source. Conversely, fire that

originates within the Storrie Fire would become less resistant to control when moving into the proposed action treatment areas.

Present Actions

Ongoing projects of Forest Service Land in the Creeks Project analysis area are listed in Appendix A, Table A-2. The table shows that the first of the HFQLG projects that are ongoing began in 1999. Ongoing projects on private land within the Creeks analysis area include 188 acres of clearcuts, 1,441 acres of overstory removal, and 93 acres of sanitation thinning. Currently, these projects exist as disconnected patches and do not provide landscape scale fuel treatment. Lives, property, and natural resources in and around the Creeks Project area are at risk from wildland fires that have potential to be large in scale and size and exhibit intense fire behavior.

All ongoing actions in the analysis area, combined with past and future action create a cumulative effect where overall surface and aerial fuel loading is decreased throughout the analysis area. This effect would, in turn, cumulatively provide less resistance to control of wildland fire.

Foreseeable Actions

Foreseeable projects in the Creeks Project analysis area are listed in Appendix A, Table A-4.The Proposed Action is intended to implement a DFPZ as part of an extensive fuel treatment network that is effective in reducing the potential size of wildfires, while providing fire suppression personnel safe locations for taking actions in the event of a wildfire. The development of this network is ongoing and would continue through the life of the 1998 HFQLG Forest Recovery Act legislative charge. Maintenance of the DFPZ is planned from 5 to 30 years beyond project initiation. A discussion on maintenance is included in the Creeks DFPZ Maintenance section in Appendix A, Table A-4. A decision on what type of treatment would be made at the time that maintenance is required. The maintenance of the DFPZs would become part of the District's fuels management program.

Implementation of the Proposed Action would enhance the ability of fire managers to contain and control future fires in the project area. Future fuel treatment maintenance activities would enhance the longevity and effectiveness of these treatments. The growth of conifer seedlings, forbs, and brush (deer brush, white thorn, and manzanita) would occur in group selection units. Small trees in group selection units would continue to be vulnerable to scorch-related mortality in the near future. Fuel treatments would help provide continuity between existing WUI fuel treatments, as well as enhance the effectiveness of work that would be completed or implemented in the future (either privately or through other sources) by landowners and the Plumas County Fire Safe Council.

Air Quality

Prescribed and pile burning is planned through the proposed action (Creeks Appendix A, Table A-4). Prescribed and pile burning is also planned to occur on other projects both on Forest service and private lands within the analysis area. A smoke management plan would be submitted to and approved by both the Plumas County Northern Sierra Air Quality Management District (NSAQMD) and the Butte County Air Pollution Control District (ACPD) for anyone burning within these districts. By adhering to a smoke management plans approved by NSAQMD, particulate matter emissions cumulative pile or understory burning would not violate California Ambient Air Quality (CAAQ) emission standards in the analysis area. Short duration production of smoke and associated emissions would occur during pile and understory burning in the analysis area.

The proposed action, some foreseeable maintenance, along with other past, present and foreseeable fuels treatment on both private and Forest Service lands in the Creeks analysis area would cumulatively create a landscape more representative of Condition Class 1 than what currently exists, the majority of which is Condition Classes 2 and 3. This conversion would further benefit resource values, property, and people, while creating fuel breaks where reduction in wildland fire resistance to control would benefit the safety of firefighters. Stand structure and composition would be similar to ecological conditions that had existed prior to the fire suppression era.

Alternative 2 – No Action

Direct Effects

Implementation of the Herger-Feinstein Quincy Library Group (HFQLG) Forest Recovery Act would not be achieved in this part of the HFQLG pilot project area. National Fire Plan standards to achieve desired conditions for wildland fire behavior would not to be met over most of the project area. Surface fuel would not be reduced and would remain abundant. Stand density would remain high. Ladder fuel conditions would remain in a hazardous state. Crown bulk density mass would exist at levels that positively influence crown fire propagation and spread. There would be no direct effects from smoke in the project area under this alternative.

Alternative 2 would not reduce the fuels in the project area. High surface fuel loading and low canopy base heights exist in most stands. The dense canopy results in high canopy bulk densities that can sustain a crown fire. Both surface and ladder fuels would continue to increase, which would increase the risk of a high intensity fire, should a fire become established. The chance of an ignition in the project area would remain the same. Fire starts occur in a random manner in the project area and would continue to do so in the future. The number of starts in the project area is expected to remain about the same in the future.

Indirect Effects

The absence of fuels treatment and prescribed fire over time would create a situation where continual increase in fuel loading would occur across the project area. Down woody material would be added to the forest floor annually at a rate that is greater than decomposition. Absence of thinning would allow ingrowth of undesirable, shade-tolerant trees to increase. As stands become denser with understory ingrowth, trees and shrubs become stressed. As a result, mortality increases. As the understory and canopy vegetation begins to die, fuel loading on the forest floor begins to amplify. Dead brush and trees that are left standing serve as ladder fuels. These factors, individually and combined, would cause an increase in the probability of stand replacement in the event of a wildfire. Predicted increase in fire behavior would also create a high rate of residual tree mortality. Across the project landscape Condition Classes would remain at 2 and 3.

Under 90th percentile weather conditions, flame lengths in a wildfire would be in excess of four feet in much of the project area (Table 3-20). Fire hazard in the area over time would become more intense and severe and the potential for large fires would increase. Severe fire behavior would create a situation where direct fireline attack would be prohibited. Such a situation would allow fires to become considerably larger and potentially more hazardous for firefighters and those communities at risk. The threat of wildfire moving into communities lying within the Creeks Project analysis area would remain high. Associated smoke from intense, severe wildfires would create both a nuisance and health concerns in these communities for considerable durations (days or weeks).

Indirect Effects on Fire Effects

The No Action alternative was modeled for fire behavior, CBH, CBD, and fire effects on stand composition and structure using the Forest Vegetation Simulator (FVS), the Fire and Fuels Extension (FFE) to FVS, and Fuels Management Analyst (FMA). Modeling for fire behavior, CBH, and CBD, was done on six selected CWHR classes that are representative of forest types within the Creeks Project area. Modeling parameters are those described in Table 3-15 for 90th percentile fire weather. Modeling for fire effects on stand composition and structure used a different set of fire weather parameters that represent common conditions in the project area during summer months, but are less than 90th percentile conditions. Modeling for fire behavior is presented first, and then followed by modeling for fire effects on stand composition and structure.

Fire Behavior

Modeled fire behavior results for the No Action alternative are shown in Table 3-27. Modeled CWHR classes are in Condition Classes 2 and 3, and are the same CWHR classes modeled under Alternative 1.

Table 3-27. Predicted fire behavior under the No Action alternative

CWHR Class	Flame Length (feet)	Rate of Spread	Crown Base Height (feet)	Canopy Bulk Density Kg/m3
2D	6.4	9.8ch/hr	6	0.296
2M	6.4	9.8ch/hr	9	0.214
3D	6.4	9.8ch/hr	8	0.147
3M	6.4	9.8ch/hr	6	0.183
4D	6.4	9.8ch/hr	5	0.110
4M	6.4	9.8ch/hr	8	0.165

Source: Almanor Ranger District; FVS and FMAPlus output files

Table 3-27 shows that predicted flame lengths in all of the stratum, where fire behavior was modeled, are in excess of four feet. The rule developed by the National Wildfire Coordinating Group (NWCG) is that once flame lengths exceed 4 feet, firefighters on the ground cannot directly attack fire. Equipment, such as air tankers and bulldozers, would be needed to directly attack the fire. In areas where torching occurs, flame lengths and associated fire behavior would be much higher. The probability of trees torching within the stands would be relatively high throughout the area ranging from 45% to over 95%. The existing average CBH in all sampled stands ranges between 5 to 9 feet (Table 3-27). This is less than desired and would allow fire transition into the canopy with relative ease. Considering existing CBH and CBD, these stands are at high risk for a stand replacing wildfire. The predicted average CBH ranges from 0.110 to 0.296 kg/m3. As discussed earlier, thinning to reduce canopy bulk density to less than 0.10 kg/m3 is generally recommended to minimize crown fire hazard when a fire moves into an area from an outside point source (Agee, 1996). Predicted flame length and rate of spread are the same for all CWHR classes under the No Action alternative because the weather and fuel inputs to the model were the same for each class. The representative sample of the CWHR classes that were modeled for pre-treatment fire behavior covered 42% of the DFPZ area (2,492 acres).

Stand Composition and Structure

A simulated wildfire was modeled to estimate potential wildfire effects on stand structure and composition in approximately 50 untreated stands. Modeling parameters are the same as described for fire effects on stand structure and composition for the Proposed Action. The modeled parameters are common conditions in the project area during hot summer months but are less than 90th percentile conditions which represent the upper bounds of typical hot summer burning conditions.

Potential fire effects are discussed for the representative 4M stand and for the project area as a whole. The simulated fire in 2005 removed approximately 15% of the stand basal area, predominantly in smaller trees. Approximately 20% of the trees between 10 to 20 inches dbh were killed and 1 tree per acre over 20 inches dbh was killed. All seedlings and saplings were killed. Average tree diameter increased post fire from 18 inches dbh to 22 inches dbh, and average canopy cover was reduced to approximately 35%. Stand density was reduced to a desired level near 40% of maximum SDI. Average flame length was above the desired maximum of 4 feet, measuring 4.7 feet. When a simulated fire was modeled for ten and twenty years out (years 2015 and 2025), this stand experienced over 90% mortality. This most likely results from small under story trees growing into the canopy and creating increasingly dense continuous fuel ladders.

On average, a fire simulated in 2005 in CWHR canopy class "M" stands caused complete (over 90%) mortality in 20% of the stands whereas the remaining stands burned much less severely with an average mortality of approximately 20% of stand basal area, predominantly in smaller trees. Fire simulation projected into year 2025 yielded considerably higher mortality results with over 40% of canopy class "M" stands burning completely (over 90% mortality) as a result of continued densification and fuels accumulation. The remaining CWHR "M" stands experienced considerably less mortality averaging just over 20% of stand basal area, predominantly in smaller trees.

CWHR canopy class "D" stands modeled similarly to "M" stands under a simulated fire in 2005. Just over 20% of the stands modeled experienced complete mortality. The remaining stands lost on average 30% of stand basal area, predominantly in smaller trees. The CWHR "D" stands modeled significantly higher mortality under a simulated fire in 2025, with 75% of the stands experiencing complete mortality and the remainder averaging near 30% mortality of basal area.

In summary, modeling of a fairly "typical" wildfire in 2005 generally removed small and midstory trees and left overstories intact in approximately 80% of CWHR "M" and "D" stands modeled. While post fire stand conditions are similar to desired conditions, wildfire creates additional fuel loadings that pose a risk of subsequent stand replacing fire behavior in the near (next few decades) future. Torching (isolated burning of overstory trees) would likely kill some desirable trees (pine and/or trees with full crowns) because of continuous fuels created by understory trees and low crown bases.

Through time, the likelihood of a wildfire causing complete stand mortality increases as fuels continue to accumulate. By year 2025 approximately 75% of the canopy class "D" stands and 40% of canopy class "M" stands modeled experienced total mortality. In other stands, wildfire removed most if not all understory trees and all regeneration, and generally reduced stocking density to within desired levels (between 35- 45% of maximum SDI).

Indirect Effects to Air Quality

This alternative would create no short-term impacts to the local areas from prescribed fire. However, the risk of a major air quality impact from a large wildfire burning in the area would increase as the fuel loadings continue to increase. In the event of large wildfires burning in the project area, the amount of smoke created is increased for several reasons: more acres burned in a short period of time, burning under hotter and drier conditions so the surface fuel consumption is increased, and green needles from the ladder fuels and canopy contribute to smoke production.

Cumulative Effects

Past, present, and foreseeable actions in the project area are the same as those used for Alternative 1. Further maintenance understory burning is planned in some of these project areas. However, these projects exist as disconnected patches and do not provide landscape scale fuel treatment. Lives, property, and natural resources in and around the Creeks Project area are at risk from wildland fires that have potential to be large in scale, size, and would become behaviorally intense under the No Action alternative.

Under the No Action alternative, surface fuel loading throughout the Creeks Project area would accumulate appreciatively over 20 years. Projected fuel loading for 3D, 4D, 3M, and 4M (MC, RF, WF) CWHR classes was modeled using the Forest Vegetation Simulator. The model showed that fine surface fuel loading (0.1 – 3.0 inches diameter) in the 3M and 4M classes would increase by over 1,400%, if undisturbed (2005 – 2025). The model showed that fine surface fuel loading in the 3M and 4M classes would increase by over 126%, if undisturbed (2005 to 2025).

Alternative 14

The Fire and Fuels Report for Alternative 14 outlines the fundamental changes from Alternative 1 in describing fuels conditions, fire behavior and environmental effects that would occur with the differences between the two alternatives.

Direct Effects

Direct Effects to Defensible Fuel Profile Zones

Although the total acreage of DFPZs between Alternative 14 and Alternative 1 would remain the same, a new DFPZ prescription would be added into Alternative 14 that was not in Alternative 1. It is named Prescription E. Prescription E would replace approximately 10 percent of Prescription B from Alternative 1 in six distinct DFPZ segments comprising 612 out of 5905 acres of all DFPZ area within the Creeks project area. The following describes the differences in DFPZ prescriptions for Alternative 14:

Prescription B – a minimum of 35-40% crown closure would remain in DFPZs following treatment, with no leave islands. Leave islands are ¼ acre polygons inside of the DFPZ where no tree removal or other activities would occur over. There would remain less basal area per acre in conifer stands with more trees per acre when compared to Prescription E.

Prescription E - a minimum of 40% crown closure would remain in DFPZs following treatment, with 10% of the DFPZ areas as leave islands (1/8 to 1/4 acres each). This would constitute 61 acres of leave islands, which is approximately 1% of the total DFPZ area within the Creeks project. A 100 foot buffer would exist

between any DFPZ boundary and the perimeter of a leave island. This prescription features a higher basal area with less trees per acre when compared to prescription B.

Differences in the direct effects, when compared to those from Alternative 1, would be very minimal because only 1% of the DFPZ network within the project area would become leave islands. Some basic assumptions are made regarding the differences. Average crown bulk density would show a slight and unappreciable increase from Alternative 1 within those the DFPZs in Prescription E. The same assumptions would be made for average crown base height and surface/aerial fuels.

Direct effects to Area Thin

The differences in direct effects, when compared to those from Alternative 1, would be minimal. There would be some area thins where no group selections would drop out. In those units, there would be no direct effects in canopy cover, crown bulk density, or fuel loading. Area thins where only one or two group selections would be removed would be so isolated and relatively small (1-4 acres), no appreciable difference would be recognized in canopy cover, crown bulk density, or surface fuel loading. Area thins where 7 to 9 group selections would be removed would increase crown cover by no more that 5% when compared to Alternative 1, but no appreciable difference would be recognized in average crown bulk density, average crown base height, or surface fuel loading.

Direct effects to Prescribed Fire and Pile Burning

Because less groups would exist in Alternative 14, when compared to Alternative 1, there would be a slight increase in the amount of underburning with Alternative 14. Conversely, there would be less area of broadcast slash burning in Alternative 14. Predicted fire behavior within the area thins would be the similar as in Alternative 1. The primary difference would be that where leave islands occur, expected fire behavior would increase. Further discussion is included within the indirect effects analysis for DFPZs of Alternative 14.

Direct effects to Group Selection

The differences in direct effects, when compared to those from Alternative 1, would be very minimal. As 59 acres of groups are removed from Alternative 1, a comparatively small increase in average canopy cover and average crown bulk density would occur in the DFPZ. Average crown base height would decrease. An

Indirect Effects

Indirect Effects to Defensible Fuel Profile Zones

The indirect effects, when compared to those from Alternative 1, would be very minimal. Some basic assumptions are made regarding the differences. Both wildland and prescribed/pile fire behavior would not change appreciably when coming from an outside point source, as the structure and composition of the DFPZ perimeters would remain the same as Alternative 1 within a 100 foot buffer of DFPZ perimeter. Fire behavior inside the DFPZs would only be different if it were to enter the leave islands, where fireline intensity, flame length, and rate-of-spread would be somewhat increased. Some torching of single trees would likely occur within those islands. Increased particulate matter output from fire would not be significant. The fire risk would remain the same as Alternative 1 because the fires are caused by human or lightening activity would essentially be the same under both action alternatives. As with Alternative 1, the fire hazard would be reduced, as would fire behavior within treatment areas and from outside point sources. The treatment of surface, ladder

and canopy fuels would be significantly reduced, therefore reducing the fire hazard. The difference in acre treatments between Alternative 1 and 14 really do not appreciably alter stand structure to make a difference.

Indirect Effects to Area Thin

The differences in indirect effects, when compared to those from Alternative 1, would be very minimal. Predicted wildland and prescribed/pile fire behavior within the area thins would be similar as in Alternative 1. The primary difference would be that where leave islands occur, expected fire behavior would increase. Expected tree mortality would as well (up to 20%). The fire risk would remain the same as Alternative 1 because the fires are caused by human or lightening activity would essentially be the same under both action alternatives. As with Alternative 1, the fire hazard would be reduced, as would fire behavior within treatment areas and from outside point sources. The treatment of surface, ladder and canopy fuels would be significantly reduced, therefore reducing the fire hazard. The difference in acre treatments between Alternative 1 and 14 really do not appreciably alter stand structure to make a difference.

Indirect Effects of Prescribed Fire and Pile Burning

The differences in indirect effects, when compared to those from Alternative 1, would be very minimal. Expected tree mortality in the area thins would increase when fire mould moves into leave islands (up to 20%).

Indirect Effects of Group Selection

The differences in direct effects, when compared to those from Alternative 1, would be minimal. When compared to Alternative 1, wildland fire behavior in the DFPZ would be no different.

Cumulative Effects

Cumulative Effects of Defensible Fuel Profile Zones

Past and Present actions would be the same as discussed in Alternative 1. The difference in foreseeable actions from Alternative 1 is that less ground and aerial fuel would be removed, slightly increasing canopy cover percent and overall fuel load in Alternative15. Because a 100 foot buffer would exist between any DFPZ boundary and the perimeter of a leave island, fire arriving from an outside point source would result in similar behavior inside the DFPZ as Alternative 1. Fire that would move into leave islands would result in some torching of single trees and up to 20% mortality. Overall the cumulative effects of prescribed and pile fire are essentially the same for Alternative 14 when compared to Alternative 1 due to the relatively minimal changes in DFPZ treatments. Although the total acreage of area thins between Alternative 14 and Alternative 1 would remain the same, the fundamental difference is that a total of 59 acres of group selection units would be removed from Alternative 1, which includes 1245 acres of area thinning. Alternative 14 would include 1186 acres of group selection units. In Alternative 14, almost every area thin has a group or two that will be dropped from Alternative 1.

Cumulative Effects Area Thin

Past and Present actions would be the same as discussed in Alternative 1. The difference in foreseeable actions from Alternative 1 is that less ground and aerial fuel would be removed. There would be a sight increase in canopy cover percent and surface and aerial fuel load in Alternative 14. Were fire to move into leave islands, expected fire behavior and mortality would increase. Expected tree mortality could be as high as 20%. Overall

the cumulative effects of prescribed and pile fire are essentially the same for Alternative 14 when compared to Alternative 1 due to the relatively minimal changes in area thinning treatments.

Cumulative Effects Prescribed Fire and Pile Burning

Past and Present actions would be the same as discussed in Alternative 1. The difference in foreseeable actions from Alternative 1 is that less broadcast slash burning would occur with a slight increase in the amount of underburning. Were fire to move into leave islands, expected fire behavior and mortality would increase. Expected tree mortality could be as high as 20%. Differences in particulate matter from smoke emissions would be negligible when compared to Alternative 1. Overall the cumulative effects of prescribed and pile fire are essentially the same for Alternative 14 when compared to Alternative 1 due to the relatively minimal changes in area and type of burning.

Cumulative Effects Group Selection

The Silviculture Section (Creeks FEIS, Chapter 3, Alternative 14) describes Group Selection Units, including comparisons to Alternative 1. An insignificant increase in surface fuels in the DFPZ would occur, compared to Alternative 1. Past and Present actions would be the same as discussed in Alternative 1. The difference in foreseeable actions from Alternative 1 is that a comparatively small increase in average canopy cover and average crown bulk density would occur in the DFPZ because of the decrease in group selection unit area when compared to Alternative 14. Average crown base height would decrease. An insignificant increase in surface fuels in the DFPZ would occur, compared to Alternative 1.

Wildlife

This section assesses the potential effects on terrestrial wildlife and their associated habitats that are likely to be impacted by the project. This analysis includes federally listed species; species listed as sensitive by the Regional Forester, Pacific Southwest Region; and Lassen National Forest management indicator species (MIS). Habitat models, where available, are used as tools in the assessment of direct, indirect, and cumulative effects. For the species considered in this analysis, there is sufficient information to assure a reasoned determination of the direct and indirect effects proposed in the nearly 33,000 acre project area project area. The project area encompasses portions of several watersheds and serves to provide assess of wildlife habitat impacts at a landscape level.

This Wildlife Section of Chapter 3 is lengthy and therefore divided into five topics of discussion. Note that following this introduction with current Forest management direction, the topics will be discussed in the following order: (1) key habitat attributes in a forest environment; (2) species that are either federally listed, proposed for federal listing; (3) sensitive species listed by the Regional Forester; (4) individual management indicator species (MIS) applicable to the project; and (5) a general assessment of impacts to migratory land birds (a.k.a. songbirds).

While this analysis can assess the risk to species of concern that occur as a result of project implementation, a number of broader effects that may result from the project, particularly on species of concern such as the California spotted owl are more difficult to ascertain as there is no baseline information on which to draw conclusions. Examples of these affects include the impacts due to changes in the landscape from management activities although other habitat objectives are met. To address these outstanding issues, the Region, in cooperation with the Pacific Southwest Research Center, developed an administrative study on the Plumas and Lassen National Forests as a means to resolve some of the management issues that have wildlife species as a focal point. Through the implementation of projects such as this Proposed Action, the study is expected to provide land managers with better tools to assess these broader issues.

The Almanor Ranger District initiated a songbird monitoring program in1997 to assess the status of migratory landbirds within specific habitats such as shrub and meadow communities. This was more recently incorporated as a key component of the administrative study. The monitoring has led to a set of recommendations for habitat improvement within a number of vegetative landscapes. This analysis will review several key recommendations and provide a summary of effects to land bird habitat based on the results of the monitoring.

Forest Direction for Federally Listed and Sensitive Species

A list of federally threatened or endangered species, including those proposed for listing, that may occur on the Lassen National Forest was obtained from the US Fish and Wildlife Service Website (USDI F&WS, 2005). The website replaces the Quarterly Report that was provided to the Forest by the US Fish and Wildlife Service.

Direction for these species is taken from a variety of sources including the Forest Service Manual and Handbook (2670) and the 1993 LNF LRMP as amended. The 1993 LNF LRMP specifically directs the Forest to "assist in the recovery efforts for Threatened and Endangered species" (USDA FS, 1993a 4-35).

The 1993 LNF LRMP also provides a series of standards and guidelines for sensitive terrestrial wildlife species. These standards and guides have been variously modified by several Forest Plan Amendments including the CASPO Interim Guidelines Environmental Analysis (USDA FS, 1993b), and by the Herger-Feinstein Quincy Library Group (HFQLG) Forest Recovery Act FEIS (1999), FSEIS (2003) and RODs (1999, 2003) and the Sierra Nevada Forest Plan Amendment (SNFPA) FEIS (2001), FSEIS (2004) and ROD (2004). Current applicable direction (in part) for the management of terrestrial wildlife species includes the following:

- Create 300 acre protected activity centers (PAC) around all territorial California spotted owl sites active since 1986 (USDA FS, 2004a pg. 37). The PACs developed under the CASPO Interim Guidelines remain in place, including PACs that are based on presence only and do not include known territorial owl sites.
- Create 200 acre PACs around all recently active goshawk territorial sites (USDA FS, 2004a pg. 38). This direction replaced the Forest Plan direction that created the 50-acre Goshawk Management Areas (GMA).
- Place a buffer around all known marten (100 acres) and fisher (700 acres) den sites (USDA FS, 2004a pg. 39).
- Implement limited operating periods around active nest/den sites (Table 3-28).
- Utilize Limited Operating Periods (LOP) to limit impacts to nesting (Table 3-28).
- Develop a Bald Eagle Management Plan prior to project initiation in areas of historical nesting (USDA FS, 1999b).
- Surveys (meeting R-5 protocols) for northern goshawk and California spotted owl are also directed; however, LOPs applied to suitable habitat may be used in lieu of surveys.
- Assess the impacts of connectivity between areas of late successional habitat for forest carnivores.

The 2004 SNFPA FSEIS amended several 1993 LNF LRMP standards and guidelines. For example, forest carnivore habitat management areas (HMA) are no longer recognized as a land allocation. Spotted Owl Habitat Areas (SOHA), which were incorporated into the CASPO interim guidelines, have been removed as part of the overall strategy for conserving late successional species but have been retained as a land allocation until the end of the HFQLG Pilot Project. The Forest is directed through the 1998 HFQLG Act and HFQLG FEIS and ROD (1999) not to enter SOHAs or spotted owl PACs through the life of the pilot project.

Table 3-28: LOPs for selected terrestrial wildlife

Species	LOP Period
California Spotted Owl	March 1 to August 31
Northern Goshawk	February 15 to September 15

Source: USDA Forest Service2004a and USDA Forest Service 1999b pg 2-8.

The 2004 SNFPA ROD also provided a specific set of Standards and Guidelines for the Forests covered in the HFQLG Pilot Project area. This direction is found in the 2004 SNFPA ROD pages 66-69.

Forest Direction for Management Indicator Species

The 1993 LNF LRMP, Appendix O includes habitat assessment models for management indicator species (MIS) that are useful in estimating project affects. In part, the direction for wildlife species (including non-TES MIS) includes:

- Provide sufficient habitat for species dependent on snags, nest cavities, and dead and down wood (USDA FS, 1993a pg 4-6, 4-37).

- Enhance ecotones and provide other special habitat elements to maintain or increase species diversity (USDA FS, 1993a pg. 4-6, 4-37).
- Coordinate wildlife management programs with other resource management programs to meet habitat or population objectives established for MIS (USDA FS, 1993a 4-38).
- For MIS species emphasized in the Management Area Direction, provide medium or better habitat capability as defined in accepted habitat capability models (1993 LNF LRMP Appendix O).

The 2004 SNFPA FEIS did not amend the MIS list for Forest Plans but did modify some direction for MIS, stating that the SNFPA Record of Decision supersedes previous direction where there is conflict.

Key Habitat Attributes

This section reviews the current conditions (affected environment), as well as, the potential impacts (environmental effects) due to implementation of the two alternatives on two key habitat attributes: (1) general vegetation changes; and (2) selected vegetation decadence -- snags and down wood. The assessment of the effects on vegetative and decadence attributes is normally provided within the species discussion. Habitat attributes are, however, the basis for most analysis. Therefore, an expanded discussion of this topic is provided first to serve as background information for a better comprehension of the potential impacts to terrestrial wildlife species.

Reviewing the change in vegetation is a key component in measuring the project generated impacts to wildlife. Analyzing vegetation data can provide estimations of the amount of suitable habitat, estimations on the value of the habitat, and describe the dispersal of habitat elements across the landscape. These are key factors in determining the effects a project may have on terrestrial wildlife species. Normally, vegetation is quantified and analyzed at the landscape or watershed level utilizing one or more vegetation mapping systems such as Cal-Veg or Forest Service stand data. In this case, the project area is sufficiently large to evaluate changes at a landscape scale. Each of these vegetation modeling systems provides a unique labeling system to describe the dominate tree sizes, the density of the canopy, and the vegetation community. For this assessment, the CWHR computer program developed by the California Department of Fish and Game (1990) is being utilized to describe stand conditions through a strata label.

While strata information provides an overall look at habitat condition, strata labels alone do not provide enough information for a full analysis of effects. A number of additional factors must be considered such as the position of the stands upon the landscape, the spatial relations of like habitat, and the overall patterns of the vegetative communities on the landscape. Vegetation or habitat complexity is typically described as the amount of heterogeneity at both the landscape and stand. Historically, the Sierra Nevada has been highly diverse in the number of plant species and remains so to this day (1996, SNEP Vol. 1. pg 10). Based on fire history, predicted return intervals (Beaty and Taylor 2001) and reviews of unmanaged forests (North et al., In Press), it is highly likely that individual stands were also highly variable in terms of canopy closure, age classes, and species composition.

This analysis does consider heterogeneity at both the landscape and stand level. The landscape level analysis is a requirement under NFMA and detailed discussion can be found in the Silvicultural Section of this document. The stand level, which has direct bearing on habitat suitability for species considered in this Wildlife Section. Heterogeneity at the landscape level is measured by the following attributes:

- A diversity of size and age classes in conifer stands.
- Riparian habitats represented along at least perennial drainages.
- Shrubs and open areas represented throughout the landscape.

Stand level heterogeneity is displayed through the following attributes:

- Two or more canopy layers.
- A variable canopy density (canopy closure).
- The presence of ground vegetation (forbs/grasses/seedlings).
- Highly variable basal area (stems/acre).
- Stand decadence (including disease such as mistletoe or heart rot).

In addition, heterogeneity must be considered in terms of what is sustainable over time given the vegetative community's position in the landscape (aspect and elevation), soils, and other ecological factors.

This analysis describes and assesses habitat in terms of CWHR classes or characteristics and intentionally avoids the use of terms such as "old growth", "ancient forest", and "legacy tree". The analysis also assesses impacts to the relative value or importance of these habitat conditions across the project area in terms of connectivity rather then in terms of fragmentation. A detailed rationale for this analysis approach is provided in the Biological Evaluation/Biological Assessment for the Selected Alternative, Creeks Forest Health Recovery Project, hereby incorporated by reference.

General Vegetation Changes

Affected Environment

Methods used for describing habitat.

The majority of the landscape within the project area is dominated by coniferous forest composed chiefly of fir and mixed conifer communities, which are classified as small under the California Wildlife Habitat Relationships (CWHR) computer program (Table 3-2). CWHR classifies stands in a manner similar to the Forest Service timber strata and provides information on a wide variety of wildlife species including habitat needs and relative habitat value. The CWHR program provides an overall numerical value for reproductive habitat, cover habitat, and foraging habitat. Habitat value for the habitat suitability models within the program is numerically quantified as 0 [low], 0.33, 0.66, (moderate) or 1 [high] (CA F&G, 2003). The vegetative data used for this analysis was derived from the silvicultural resource section of this document, which was based on the vegetation GIS layer developed by Vestra and District stand exam data. The size descriptors provided in the vegetation tables (seedling, sapling, pole, small, and medium/large) are derived directly from the CWHR computer program (CA Department of Fish & Game, 2002) and text guide (Mayer and Laudenslayer, 1988). However, the use of these size descriptors is hardly universal and the CWHR descriptors pertaining to the size of the conifers do not correspond to the common size descriptors used by the Forest Service. Because of this dichotomy, no analytical use is made of the descriptors that refer to size other than to categorize the stand as suitable or unsuitable for the particular species being analyzed. In addition to the conifer stands that dominate the landscape, there are a number of riparian stringers and meadows on both private and federally managed lands, particularly along the main drainages such as Butt Creek. Aspen, a management indicator species, occurs throughout the project area. Anecdotal information, supported by stand exam data, indicates that most of the aspen stands are declining from apparent competition with over crowning conifers. The declining trend

for this valuable habitat is at high risk of being lost without actions taken which would favor shade intolerant aspen; actions such as thinning within and adjacent to aspen stands.

Habitat within the Project Area

As discussed within the fuels and silvicultural sections, stand densities have increased since the inception of fire suppression. This increase in stand densities has resulted in a decline in the amount of understory biomass within forested lands. Oliver et al (1996) point out that stand densities can affect the rate and vigor of tree growth, change cover patterns for wildlife, and affect the understory tree, shrub, and herbaceous growth. Tree vigor, stem and branch size, and understory development decline as canopy increases (Oliver et al 1996). North et al (In Press) demonstrated that the amount of herbaceous cover was positively correlated with soil moisture while the presence of shrubs commonly found in mixed conifer forests was positively correlated with diffused (less direct) light and low soil moisture. North et al (In Press) also point out that late successional mixed conifer habitats have distinct gaps where shrub and herb richness is higher than in the understory. Peek et. al. (2001) reviewed changes in the understory biomass over a 35 year period in south-central Oregon. Pase (1958 IN Peek et. al. 2001) reported an inverse correlation between the percent crown cover in a ponderosa pine stand and the amount of herbaceous production. In their study area, Peek et. al. found that open-canopied forests (<30% canopy cover) within the Sierra Nevada's declined from approximately 65% of the landscape in 1953 to approximately 17% by 1988 in the elevations between 1,425 meters and 1,600 meters. Conversely there was an increase in moderately-canopied forests. During the 35 year period of the study, understory biomass was believed to have declined about 44% within the 1,425 meter to 1,600 meter (4,830 feet to 5,424 feet) elevation range, from 22.6 g/m^2 to 9.9 g/m^2 (Peek et. al., 2001).

Changes in the project area are thought to have mimicked those cited in Peek et. al. (2001), Oliver et. al. (1996), and North (In Press). The inception of fire suppression has led to stands becoming denser, primarily through the incursion of white fir. A number of actions within the last several decades (Appendix A) have also contributed to current conditions; though the impact of these changes on wildlife is difficult to assess. There is likely more suitable habitat for species requiring closed canopied stands due to site conversions from shrubs to conifers. However, overstory removal and other prescriptions which concentrated on removing the older trees has resulted in stands composed of younger conifers that lack the attributes afforded by unmanaged, late successional groves. The relative large area (nearly 50% of the project area) treated through various vegetation management activities in a relatively short time (within the last 2.5 decades) has resulted in a project area that is dominated by young, dense stands, with little landscape diversity.

There are a number of stands throughout the project area that have some level of shrub development. Many of those stands are plantations or naturally open areas. Roads (including old temporary and skid roads) also have a large influence on shrub growth as road edges provide the disturbance preferred by most shrubs and provide more direct as well as diffused sunlight. Plantations resulting from thinning retain moderate to heavy amounts of shrubs which have been maintained through occasional thinnings. Where shrubs have occurred naturally, thinnings have helped to retain some level of shrub cover.

Despite the apparent distribution of shrubs and forbs along roads and in plantations, the habitat surveys conducted to date have shown that understory biomass (except for young conifers) is limited, generally less than 15%, although the amount of understory is highly variable. Where understory vegetation is present, most of that vegetation is composed of shrubs including whitethorn, manzanita, chinquapin, and bitter cherry. Most

of the stands appear to have insufficient light, diffused or otherwise, reaching the forest floor to support understory vegetation except in very mesic (wet) conditions. This is particularly pronounced in even-aged stands where the average conifer exceeds 15 inches dbh. Understory vegetation is slow to return to stands where vegetation management activities have taken place. Thinnings within the project area that were completed within the last 5 years show little sign of a developing understory vegetation. There may be several reasons for this, lack of soil moisture in combination with sufficient direct light, lack of sufficient light even if diffused (North et al., In Press), or other causes such as a lack of seed bank. A review of older stands indicates that understory vegetation will eventually return if there is sufficient light either as an understory or in more open patches as is thought to be the more "natural" setting.

Environmental Effects

Alternative 1 - Proposed Action

Direct/Indirect Effects of General Vegetation Changes

Table 3-2 displays the current CWHR classes for all strata within the Creeks Project area before changes resulting from the alternatives are applied. Table 3-7 displays strata changes that are associated with the Proposed Action. There would also be a number of changes to the vegetation communities that are not fully described by strata including changes in basal area, stand structure and stand composition. Those changes include:

- Approximately 9,190 acres within the project area having a canopy reduction resulting in canopies that range between 30% to 50% within DFPZ's and 40% to 50% within area thinnings.
- Approximately 1,245 acres would be changed from medium aged, moderately dense canopied stands to pockets of early successional habitat. Many of these would be artificially reforested or natural reforestation would be expected to occur within 2 to 3 years after harvest (Group Selections).
- Stand structure would tend to be more homogenous post-treatment because of a reduction of smaller conifers particularly within stands where the average conifer exceeds 16 inches to 18 inches dbh as these stands typically have more heterogeneous structure due to the age of the stand. Mastication would be used to remove shrub cover in some areas where they are currently present, temporarily reducing the age and size class diversity. Some Shrub cover would be expected to return over time (within 3 to 5 years) through re-sprouting.
- In most cases canopies would continue to be dense enough (>35% canopy cover) to limit the development of forbs and shrubs within stands to current (pretreatment) levels.
- Prescribed fire (pile or broadcast burning) would be used to further reduce the fuels remaining after treatment.

Overall, stand heterogeneity and complexity as determined by the attributes that were previously listed, would likely decline, particularly in stands with CWHR values at or above 3M and particularly within the DFPZs. Historically DFPZ prescriptions have resulted in a change to the stand structure as the understory trees are removed as a means to reduce ladder fuels and reduce the crown overlap. In some cases, there would be little change except for canopy cover. Young dense stands, generally represented by CWHR 3M and 3D, with conifers that average less than 16 inches to 18 inches dbh, typically have little structural diversity as the stands are composed of very similar sized conifers and the stands are usually not old enough to have developed

complexity. In such cases, while thinning may make changes in the amount of canopy (and relative value of the habitat for a given species); stand heterogeneity would essentially remain constant. Most of these stands are stagnant in that growth of individuals has slowed and mortality can be relatively high due to the competition for resources.

The group selections would obviously result in a complete change of vegetative structure and would increase the landscape heterogeneity as early successional habitat is generally poorly represented as a component of the landscape. Group selections would either be planted within a few years after treatment or left to naturally regenerate. Where groups are not planted, development of shrub and forbs cover would occur particularly in the larger groups (>1 acre) but the extent of shrub and forb development within each group would be governed by a number of factors including aspect, neighboring vegetation, and elevation. Smaller groups would likely develop limited shrub and forb cover due to the influences of shade caused by the surrounding stand.

Group selection treatments within thinned units (DFPZ or area thinning) would lead to higher habitat values than thinning alone. In these cases, stands that are fairly uniform would develop more complexity by higher variation in canopies. Stands that are extremely dense and dominated by trees that are less than 16 inches dbh (on average) have very little stand diversity or complexity as they are generally composed of one cohort, have little or no ground vegetation, and are generally dominated by a single species, typically white fir. Thinning these stands would increase the tree growth rates and increase conifer diversity (through retention of the less common species). The addition of group selections would further add a complexity by introducing either pockets of younger trees or shrubs, or both. Thinning older stands that have less density and have two or more cohorts are not likely to have an increase in complexity or heterogeneity. In general, thinning removes the younger cohorts which results in a more uniform age and size structure with little intra stand diversity in terms of canopy variation. The addition of group selections to these stands would add needed variation in stand structure and result in a slightly more complex (heterogeneous) stand.

More than any other treatments, group selections, are expected to result in a pronounced "edge" effect. An "edge" is generally described is the boundary, or interface, between two biological communities or between different landscape elements. Edges exist, for instance, where older forested patches border newly harvested blockcuts, or where forests verge on rock outcrops, riparian areas, grasslands, or other different harvest types or seral stages (B.C. Ministry of Forestry 1998) It is generally recognized that the presence of edge, including tree and shrub cover and open areas in close proximity, increases habitat diversity and also bird diversity. Because the effect of group selections varies by species; those that find edge or shrubs beneficial would prefer the treatment and those species that prefer closed canopied habitats would generally be adversely impacted. The effects to individual species are considered in the separate analyses.

The treatments would have little affect on the bulk of the riparian vegetation since as the majority of riparian species (individuals, clones, or populations) found in the project area are immediately adjacent to streams (50 feet for seasonally flowing streams, up to 300 feet for fish-bearing streams), springs (50 feet), meadows, or other wet areas where machinery would not enter and other actions (such as piling, underburning and hand thinning) would be limited. There may be minor improvements for aspen stands where conifers are removed around the trees but treatment would not be sufficient to facilitate new sprouts. Underburning may

adversely affect a very limited amount of riparian species but the risk to individuals is low based on the experience of previous actions.

Use of prescribed fire would have little impact on the remaining vegetation. Local experience has shown that broadcast burning can result in up to 5% conifer mortality, particularly in younger trees that are susceptible to torching or fire scorch. This in turn would have a minor affect on canopy cover within the treated area. Broadcast burning, however, can stimulate the production of new ground cover such as forbs and grasses, which would be beneficial to a variety of wildlife species.

Pile burning may also be used to remove fuels. This activity rarely has an impact on any remaining vegetative attributes. The activity also does not contribute to stimulating new forest floor vegetation. Pile burning is often noted to result in small areas that do not re-vegetate for several years. Piles, however, cover relatively little ground and therefore the impact would be minor.

Cumulative Effects of General Vegetation Changes

The area considered for cumulative effects for the analysis of key habitat attributes is the Creeks Project Area. Prior to 2000, private lands generally utilized area thin type prescriptions of various intensities. More recently private lands have had 1,192 acres of fire salvage and restoration. In 2005, recently completed and on-going actions include 188 acres of clearcuts, 1,440 acres of overstory removal, and 93 acres of sanitation.

Most of the treatments within the project area that have occurred on National Forest System Lands in the past have resulted in reductions in attributes that are used to measure stand heterogeneity within this analysis. The exception to the loss is ground vegetation, which would have increased during the initial period of logging and has been steadily declining since that time. Most other actions have resulted in declines. It is reasonably assumed that vegetative decadence has generally declined due to the applied treatments in Table 3-29. However, in certain cases decadence attributes can increase. For example, FRS treatments are expected to hasten the amount of time it takes to establish multiple canopy layers within severely burned areas. TFB treatments have been noted to lead to an increase in the amount of large down wood when material, felled during treatment, is left on site. That affect is often very site-specific and no data is currently available to indicate if this is a trend. The silvicultural section in this chapter, includes a thorough discussion and explanation of the various silvicultural prescriptions. The following tables summarize the overall sources of changes within the project area due to vegetation management treatments as outlined in Appendix A.

Table 3-29. Summary of Past Prescriptions Considered in Cumulative Effects.

Label	Description	Acres
OSR	Overstory Removal	5,534
ISC	Intermediate Sanitation	3,931
HCC	Clearcut	877
SSS	Seed Step Shelterwood	1,353
PSS	Prep Step Shelterwood	421
FRS	Fire Rehab and salvage including planting	1,206
TFB	Thin from Below (removal of lower canopy)	612
TFA	Thin from Above (removal of upper canopy)	3,146
WSS	Windthrow Salvage	1,060

Table 3-30 summarizes the impacts to those (five) vegetative aspects considered in describing stand heterogeneity. These aspects and the resulting impacts are used in the cumulative effects discussion for species considered in this analysis.

Table 3-30. Relative Impact to Heterogeneity at the Stand Level

	Treatments								
	OSR	ISC	HCC	SSS	PSS	FRS	TFB	TFA	WSS
2+ Canopy Layers	-	-	-	-	-	+	-	-	NA
Variable Density	-	-	-	-	-	NA	-	-	NA
Ground Vegetation	+	-	+	+	-/+	-	+	+	NA
Variable Basal Area	-	-	-	-	-	NA	-	-	NA
Decadence	-	-	-	-	-	-	-/+	-	-

- Low adverse impact + Low positive Impact NA - No measurable Affect

− Moderate to High adverse impact + Moderate to High Positive Impact

Past projects have resulted in reduced canopies and simplified understory structure (less heterogeneity) within the stand but likely increased overall heterogeneity at the landscape level at the time of their implementation. Treatments based on decisions prior to the *California Spotted Owl Sierran Province Interim Guidelines* (CASPO interim guidelines, 1993) generally emphasized overstory removal through shelterwood or thinning prescriptions. To a lesser extent clearcutting was also used as a treatment within the project area. Prescriptions such as HCC, SSS, and OSR tended to favor grasses and shrub vegetation. However, other treatments following harvest (planting preparation activities and stand improvement treatments) have tended to reduce the overall amount of herbaceous and shrub growth. The treatments were highly variable in their effectiveness of eliminating competing vegetation. Prescriptions developed to meet the CASPO interim guidelines generally used a thin from below prescription which retained the larger trees but had a similar affect on stand heterogeneity as a thin from above prescription. Thin from below prescriptions were generally followed up with mechanical fuels treatment which appears to have led to a reduction in the amount of potential shrub growth due to soil disturbance as well as reductions in down wood.

Based on the list of previous activities utilized for the analysis, approximately 20% of the project area has been treated within the past decade and 50% of the project area has had some form of vegetation management. This project would also act cumulatively with the planned future Willow Forest Health Recovery Project adjacent and to the west, which would provide similar results and therefore cumulatively affect a larger portion of the landscape. Group selections would act cumulatively with other projects such as the Humboldt Summit fuels project to provide limited increases in the amount of shrubs, forbs, and grasses within the area.

Alternative 2 - No Action

Direct/Indirect Effects of General Vegetation Changes

This alternative would have no short-term affects on the overall composition of the current landscape. Barring unforeseen changes (due to fire, drought, insects, etc), the landscape would continue the trend towards denser coniferous stands and expedite the current declines of the shrub and herbaceous layers. As stand densities continue to increase, there is an increasing risk that mortality would occur or would continue to occur due to competition for resources especially during drought conditions (as described in the Silvicultural section of this document). Competition for resources would slow the development of late successional stand attributes.

Riparian habitats would continue to see reductions in the health and the numbers of individuals and the extent of riparian hardwoods, particularly aspen, due to encroachment by conifers would continue to decline. Expanding conifer canopies are currently limiting the development of new riparian hardwood shoots and the trend would continue barring intervention by fire or other mechanisms (natural or anthropogenic).

Plantations are at various age levels but would, over time, develop canopies that would eventually shade out shrubs and forbs. This has been documented in a number of stands where stand canopies have increased leaving shrub skeletons.

Cumulative Effects of General Vegetation Changes

The area considered for cumulative effects to key habitat attributes is the Creeks Project Area. The past activities within the project area outlined in Appendix A and Table 3-29 as well as past management direction have led to a majority of stands that are young, relatively dense, and lack stand heterogeneity (Blakesley, 2003) particularly with respect to a well developed multi-layered stand. This is exemplified by the lack of CWHR 6 within the project area. The majority of shrub cover that provides quality forage is associated with road or project disturbance that created openings within the forest canopy. Other than roadside vegetation and vegetation on landings and skid roads, the high canopy cover has essentially precluded forb and shrub development within conifer stands. The limited shrub fields that exist within the project area have become decadent due to age and a general lack of disturbance.

Because there are no activities associated with this alternative, it would not act cumulatively with other proposed actions, particularly on private lands, to reduce canopies within coniferous stands. This alternative would, however, act cumulatively to further the trend towards reduced open space and a reduction in the extent of early successional habitat attributes across the District and Forest.

Alternative 14 –

Direct/Indirect Effects of General Vegetation Changes

Vegetation changes would be similar to Alternative 1. The reduction of approximately 59 acres of group selections would be a nominal change in the amount of intra-stand openings. The retention of untreated areas (10% of the stand) within Prescription E would increase stand heterogeneity. Since Prescription E comprises less than 6% of the project and the lands in Prescription E comprise less than 2% of the project area, the differences between the effects outlined in Alternative 1 and Alternative 14 are minimal in terms of the overall vegetation changes as a result of implementing the project. However, at the stand level, the changes would provide a desired heterogeneous complexity which is likely to be reflective of habitat improvement to a number of species, providing hiding and roosting cover.

Prescription E also makes minor improvements in small tree retention that is typically lost with standard thin from below (TFB) treatments.

Cumulative Effects of General Vegetation Changes

As with the Direct and Indirect Effects, the cumulative effects of this alternative on vegetative resources would be similar to that of Alternative 1.

Selected Vegetative Decadence – Snags and Down Wood

Affected Environment

Snags are a singularly important habitat attribute. Snags are variously defined in the literature. The data used in this analysis followed the definition provided in the Lassen National Forest 1993 LRMP that variously defines snags as any dead tree or live tree that is likely to die in six months. Snags can also include dead top trees where the dead top constitutes ⅓ to ¼ of the tree height. Not only do primary cavity nesters such as woodpeckers depend on snags, but also a host of secondary cavity nesting species utilizes cavities created by the primary cavity nesters. Cline et al., (1980) reported that approximately 20% of all bird species in Oregon depend on snags for nesting and feeding. Likewise, Burnett (2005) estimates that 20% to 22% of the bird species on the Lassen National Forest use snags in some capacity. Snags serve a secondary function as the recruitment source for down wood material, providing soil nutrients and habitat for insects and small rodents. Forest carnivores utilize down logs extensively for foraging particularly in the winter where logs serve to assist in subnivean (under snow) mobility.

Habitat surveys were completed within the project area in 2000, 2001, and 2002 that recorded snags greater than 15 inches diameter breast height (dbh) and 20 feet in height. Snag composition by tree species were initially recorded and then dropped when it was found that more then 40% of the snag trees could not be identified to species. It was readily apparent that snag recruitment was commensurate with the tree species available. Sixty-three stands were examined using Forest Inventory Analysis (FIA) techniques to assess habitat conditions within the project area. While the sample size is too small to statistically assess the conditions within the full project area, the data strongly indicates that overall snag densities vary between 2 to 3 snags/acre across the project area. These current snag densities are below the Forest guidelines of 4 snags/acre in mixed conifer communities and 6 snags/acre within red fir communities.

The lifespan of a snag is relatively short when compared to the life of the tree while alive. Landrum et al. (2002) reported snag "half-life" of 6 to 8 years. However, approximately 88 % of the snags in the study remained of useful size throughout their lifespan. Laudenslayer (personal communication, 2005) indicated his research in northeastern California shows that snags generally last about 15 to 20 years. Snags are normally classified by the amount of decay, as represented in Table 3-31, similar to down wood (logs) where 1 is a dying or recently dead tree and 5 equates to snags that have lost most of their structure and are near the point of falling down.

The actual length of time that snags provide a useful foraging substrate may be very limited. Farris et al. (2002) found that the useful foraging life for snags was approximately 3 years, which corresponds to decay class 1. Foraging life is the period of time that insects would nest in the dead or dying tree, providing birds with opportunities to forage. Farris' data would seem to indicate that snag use as foraging habitat may be more limited within a given area such as a watershed than nesting habitat. The research indicates that the retention of dying or recently dead conifers and hardwoods is imperative if the objective of providing both foraging and nesting habitat is to be met.

Snag recruitment is known to be episodic (Farris et al. 2002) and snags are created through a multitude of causes including beetle attacks, mortality from drought, fire, or a combination of factors. Because these are stochastic events, the number, size, and species of snags that would develop within the project area cannot be

accurately predicted. Snag numbers that were historically found within the project area are unknown and likely highly variable. Harrod et al. (1998) estimated that snag densities east of the Cascades ranged from 5.9 to 14.1 per acre based on annual basal area increases. It is likely that natural snag numbers were higher on the west side of the Cascades as basal area growth is higher and west side forests are capable of maintaining a higher density of trees over time.

Table 3-31: Snag data for the Creeks Project Area

Decay Class	1	2	3	4	5
Snags/Acre	0.3	1.0	0.2	1.5	>0.1
% of Snag Composition	11	31	9	48	1

Source: Unpublished District records.

Snags are often described as falling within one of two categories, hard or soft (Thomas et al., 1979; Nietro et al., 1985). A "hard" snag is generally considered as a recently dead or dying tree with many of the limbs remaining and sound wood (Decay classes 1 and 2). Hard snags serve as both foraging and/or nesting sites for a large number of bird species. A "soft" snag has had more decay processes occur (Decay classes 3, 4, and 5) with relatively few limbs left and advanced decay. Soft snags generally provide perch and cavity nesting sites and but receive less use than a hard snag (Saab and Dudley, 1998). Wildlife species make use of snags of various sizes, but snags greater than 20 inches diameter breast height generally have more value for wildlife, especially primary cavity nesters. The 1993 LNF LRMP recommends a 3:1 ratio of hard to soft snags (LRMP Appendix O), which adequately reflects the need to retain newer snags to maintain a good base of forage habitat and ensure recruitment of snags across the landscape. The data (Table 3-31) indicates the current hard to soft snag ratio is approximately 0.8: 1.

The habitat surveys that provided the data for Table 3-31 also show that snags are not evenly distributed across the project area. Compartment 374 (east side of the project area) has approximately 1.75 snags/acre while compartment 375 (west side of the project area) has approximately 5 snags/acre. Compartment 374 has had numerous entries in recent years including salvage activities in 1996 and 1997 as well as the Ruffa, Shanghai, and Fanani timber sales that have occurred within the last 6 to 10 years. Compartment 377, also on the east side of the project area has approximately 1.6 snags/acre. Compartment 375 has a large component of red fir and has had fewer recent entries, which may explain the higher snag numbers.

Nearly 58% of the snags within the project area are in decay classes 3, 4, and 5. Snags within the latter decay classes are characterized by excessive mining by beetles and excavation by birds and the tops and branches have begun to break off. . The next highest percentage of snags found on federal lands within the project area is within Decay Class 2. As illustrated in Table 3-31, approximately 1.3 snags/acre are in decay classes 1 and 2 occur within the project area.

This data pairs well with District-wide snag surveys completed in 1992 within spotted owl habitat areas (SOHA). The findings were divided into salvageable dead (which approximately equates to decay classes 1 and 2) and snags (decay classes 3, 4 and 5). In that study, decay classes 1 and 2 averaged approximately 1 snag/acre with an average dbh of 29 inches (data not collected in the study for Table 3-31). Decay classes 3, 4, and 5 were considerably higher with approximately 5 snags/acre and an average dbh of 28 inches.

There are areas within the project where snag levels have dramatically increased due to fire or other natural events. Fires that result in large-scale snag recruitment generally see a rise in primary cavity nesters for

several years, followed by a decline. Research indicates that bird populations decline as food sources (insects attacking recently dead trees) decline (Saab and Dudley, 1998).

Another decadence factor is down woody material (logs). It is intuitively obvious that the recruitment rate of down logs corresponds to snag numbers. The habitat surveys collected down log data as well. Although the data has not been converted to tons/acre due to the difficulty in factoring in decay rates, the data shows there is a sufficient amount of down logs to meet most wildlife needs. However, the size classes are within the lower diameters, which may limit habitat value.

Environmental Effects

Alternative 1 - Proposed Action

Direct and Indirect Effects of Selected Vegetative Decadence

The 2004 SNFPA ROD 2004 recommends 4 snags/acre in mixed conifer and 6 snags/acre in red fir as a means to maintain sufficient snags across the landscape to ensure habitat for snag dependent species. Project guidelines, which were included in the integrated design features, were developed specifically to address the retention of snags at the landscape level while meeting the intent of the projects' purpose and need. As Laudenslayer points out (personal communication, 2005) it is more important to ensure that a landscape has continual snag replacement as opposed to direction that requires a set number of snags within a given area. This project used design features to specifically address snag retention within the broader project area. The project is designed to meet the goals of wildlife needs while providing the options necessary to ensure safety during project implementation as well as providing for fire fighter safety in the event of a wildland fire.

There would be a general reduction in the number of snags within the areas treated, including along roads used during the life of the project. Project designs, including stand layout, are such that pockets of new snags would be retained where they do not compromise safety. Although it is impossible to predict the level of snag recruitment, it is estimated that the project design criteria would result in initial declines within the treated areas, particularly within the DFPZs where snag retention and group selections (few to none) would be lower than within the area treatments. Through the implementation of the design criteria current snag levels within the project area as a whole would see only a small drop in the overall percentage of snags and snag numbers (particularly decay classes 1 and 2) would continue to increase within the project area due to natural recruitment processes.

If prescribed fire were utilized to treat the remaining fuels after thinning, snag levels would be expected to increase within the treated areas although they are likely to be derived primarily from the smaller sized trees. Snag levels could rise 5% to10% within the various treatment areas, based on mortality estimates provided in other similar prescribed burn plans (USDA FS, 2004b) and mortality experienced in prescribed burns such as those carried out in the Prattville plantations.

Since down wood levels are dependent on snag levels, down wood material are expected to increase within the project area over time. Anecdotal information indicates that large wood recruitment actually would increase due to project activities. This is likely due to chunks of large logs that are too short for commercial purposes left in the woods rather than taken to a landing for processing (chipping). Also, snags that are fallen for safety purposes are generally left on site. These large pieces do not contribute to the fuels rate of spread therefore leaving them does not compromise the integrity of the DFPZ.

Appendix D provides the marking guidelines which are used in tandem with the snag design criteria for this project.

Cumulative Effects of Selected Vegetative Decadence

The area considered for cumulative effects to key habitat attributes is the Creeks Project Area. Table 3-30 illustrates that most treatments within the project area have contributed to declines in the number of snags across the landscape. Treatments such as intermediate sanitation and fire rehab (salvage) logging are two of the largest sources of snag loss. Snags have also been reduced through District wide salvage sales, several of which were conducted during the mid to late 1990's. Changes in direction and the design criteria developed for the project are expected to substantially reduce the trend of snag reductions due to project implementation.

Down logs, important to a wide number of species considered in this analysis, has also been adversely impacted through the activities outline in Appendix A and Tables 3-29 and 3-30. The fuels reduction and planting preparation activities generally reduced the small wood material but retain minimal amounts of the large wood.

The conditions that provide for episodic recruitment of snags have not existed since the mid 90's. Thinnings that reduce resource competition has likely reduced the recruitment of the larger snags preferred by cavity nesters. The actions considered in this alternative are likely to result in healthier conifers that are more resistant to disease and therefore snag recruitment may decline slightly within the treated areas.

The Storrie Fire resulted in a rapid increase the number of snags and down wood recruitment within a very localized area (within the area affected by the Storrie Fire). As a portion of the fire is within the project area, there would be an offset to snag loss and increases in down wood sources by ongoing mortality due to the fire affects. No further actions are planned in the Storrie Fire area that are likely to result in further reductions of snags that would cumulatively act with the actions considered in this project.

Alternative 2 - No Action

Direct and Indirect Effects of Selected Vegetative Decadence

This alternative would continue a number of factors that favor the development of snags, primarily dense stand conditions (increased competition for limited resources) and the alternative does not provide actions that would remove the snags. Under this alternative, snags would continue to develop over time at an unpredictable rate.

Within the Storrie Fire area, Cluck (USDA FS, 2005b) reports that limited numbers of conifers continue to succumb to fire effects and therefore the number of snags continues to grow at a localized level. Although fire return intervals are considerably longer than the pre-suppression era, fires are increasingly larger and more intense. The fuels section of this document provides more information on fire return intervals. If this were to occur within the project area, snags and decadence would increase dramatically. However, this would be at the expense of other wildlife attributes.

Cumulative Effects of Selected Vegetative Decadence

The area considered for cumulative effects to key habitat attributes is the Creeks Project Area. Past vegetation management activities (Appendix A, Table 3-29), salvage sales (1997-1998), and road hazard treatments

within the project area have contributed to declines in snags. The reduction in the age of the stands has slowed natural recruitment (mortality). Thinning has also reduced mortality due to a reduction of competition with other conifers. This alternative would not combine with past activities to reduce recruitment and retention of hard snags. Overall snag numbers are likely to increase over time due to natural recruitment that occurs sporadically.

Alternative 14

Direct and Indirect Effects of Selected Vegetative Decadence

The loss of snags would be slightly less than with this alternative than with Alternative 1 although the overall impacts to decadence attributes are similar. Alternative 14 would provide areas to retain snags and increase the amount of large down logs within Prescription E. Since the prescription makes up a relatively small portion of the treated area, the changes are minor. However, like the vegetative resource, the increases in decadence may prove locally important.

Cumulative Effects of Selected Vegetative Decadence

Because this prescription is essentially identical to Alternative 1, with minor increases expected in decadence within Prescription E, the overall cumulative effects would be very similar and not distinguishable from those provided for Alternative 1.

Threatened, Endangered, and Sensitive (TES) Terrestrial Wildlife Species

Table 3-32 provides a list of TES terrestrial wildlife species that occur on the Lassen National Forest. The table also outlines whether the species is considered in this analysis and why the species is either carried forward or dropped from further analysis.

California Spotted Owl

Affected Environment – Current Condition

Management Status

The California spotted owl has been at the center of controversy for well over a decade and the extent of that controversy is reflected in the number of management strategies developed to address both owl conservation and other resource management concerns, such as fuels management. One of the first formal strategies to use land allocations was the development of Spotted Owl Habitat Areas (SOHA), first defined in the early to mid 1980s within the Pacific Southwest Region. This was followed by the CASPO Interim Guidelines (1993b) which amended Forest Land Management Plans within the Sierra Nevada bioregion. In 2001, Forest Plans were again amended by the Sierra Nevada Forest Plan Amendment (SNFPA, 2001a), followed by the Supplemental SNFPA (2004a).

Table 3-32. TES terrestrial wildlife, Lassen National Forest

Species	Status	Considered	Reasons
Haliaeetus leucocephalus; Bald Eagle	FT	No	The project area lacks the lakes and large rivers preferred by this species.
Strix occidentalis caurina; Northern Spotted Owl	FT	No	The species is not known to occur on the Almanor Ranger District. The project area is outside the described range of this species.
Desmocerus californicus dimorphus; Valley Elderberry Longhorn Beetle	FT	No	Suitable habitat is found below 3,000 feet (Project elevation is generally above 5,500 feet).
Strix occidentalis occidentalis; California Spotted Owl	FSS	Yes	The project area contains 13 protected activity centers, a number of which have recent activity.
Accipter gentilis; Northern Goshawk	FSS	Yes	The project area contains 7 goshawk protected activity centers (nest territories).
Strix nebulosa; Great Gray Owl	FSS	No	The areas affected by the project lack meadow habitat large enough to meet the needs of this species. There is no recent record of this species on the District.
Grus Canadensis tabida; Greater Sandhill Crane	FSS	No	The area lacks the large open meadows preferred by this species. The meadows present are considered too small to meet the needs of this species. The species is known to occur immediately adjacent to the project within the Humbug Valley area.
Buteo swainsoni; Swainson's Hawk	FSS	No	The analysis area is outside the known range of this species.
Empidonax trailii; Willow Flycatcher	FSS	Yes	There is a historical breeding territory within the project area.
Centrocercus urophasianus; Greater Sage Grouse	FSS	No	The project area is outside the known range of this species
Martes americana; American Marten	FSS	Yes	The species has been detected within the project area.
Gulo gulo luteus; California Wolverine	FSS	No	The proximity to disturbance (campgrounds and high road densities) precludes this species.
Vulpes vulpes necator; Sierra Nevada Red Fox	FSS	No	The species appears to be limited to areas around Lassen Volcanic National Park based on research data.
Martes pennanti; Pacific Fisher	FSS/C	No	This species is considered to be extant from the area but the potential effects to habitat are discussed.
Antrozous pallidus; Pallid Bat	FSS	Yes	Habitat is extremely marginal within and adjacent to the project stands but the species may utilize adjacent home sites for roosting.
Corynorhinus townsendii; Townsend's Big-eared Bat	FSS	No	The project area lacks the structures (caves, bridges) and lack of disturbance needed by this species.
Lasiurus blossevillii; Western Red Bat	FSS	No	The project area lacks the large rivers, lakes, and reservoirs that this species has been associated with on this forest.
Clemmys marmorata marmorata; Northwestern Pond Turtle	FSS	No	Surveys have shown that populations are limited to the lower portions of Deer and Mill Creeks.

Source: USDI Fish and Wildlife 2005, LMRP
FE: Listed as Federally Endangered by the US Fish and Wildlife Service
FT: Listed as Federally Threatened by the US Fish and Wildlife Service
C: Listed as a Candidate by the US Fish and Wildlife Service.
FSS: Listed as Forest Service Sensitive by the Region 5 Regional Forester.

The US Fish and Wildlife Service (Service) was petitioned in 2000 to consider listing the California spotted owl under the Endangered Species Act (ESA). The Service found that listing was not warranted at the time, in part based on a draft population "meta-analysis" (Franklin et. Al. 2003) that indicated that the California spotted owl was not declining at a rate previously believed. In 2004, the Service was sued in Federal District Court and as a result, began another review of the owls' status. On June 21, 2005 the Service issued a finding in the Federal Register determining that there was sufficient new information that might warrant protection for the California spotted owl under the ESA. The factors that warranted a new review include revisions to the 2001 SNFPA, revisions to the California State Forest Practices Code, possible changes to the draft meta-analysis, impacts of recent fires and anticipated future fires, and the potential for further expansion of the barred owl (USDI 2005). A decision on the status of the California spotted owl is due nine months from the date of the Federal Register.

Population and Demographics

The Lassen National Forest has supported one of three California spotted owl demography studies in the Sierra Nevada bioregion since the early 1990's (Blakesley 2003), which was recently incorporated into the Plumas Lassen Administrative Study (PLAS). The Administrative Study (2005), is being conducted as a collaborative effort by the Forest Service PSW Research Station (at Sierra Nevada Research Center), Universities of California, Berkeley and Davis, and Point Reyes Bird Observatory to determine the long-term effects from forest management practices on spotted owl, song birds, and small mammals. The study will identify the response of these old-forest dependent species to change in vegetation composition, structure, and distribution over space and time. Currently, all the California spotted owl PLAS data is being collected on the Plumas National Forest and the demography study continues to provide territorial and reproductive data as it has in the past. Initial reports from all three demography studies in California (Sequoia-Kings Canyon, Eldorado, and Lassen) indicated annual declines of 7 to 9% in spotted owl populations within the respective study areas (Steger et al., 2000; Blakesley et al., 2001). A recent review of the statistical analysis indicates that the declines are not as sharp as originally predicted. Rather, populations are either stable or only slightly declining (Franklin et al., 2003). This new analysis was considered in the 2004 SNFPA FSEIS and was one of the factors that led to changes in the 2001 SNFPA FEIS. The Creeks Project area is fully within the Lassen Demographic Study.

Since the Lassen National Forest is not entirely surveyed, the actual status of the owl at the Forest level remains unknown. However, the Lassen National Forest has approximately 95 known California spotted owl territories and approximately 70 territories occur on the Almanor Ranger District. There are 19 California spotted owl territories or approximately 20% of the total known territories on the Forest, whose breeding home ranges are wholly or partially within the Creeks Project area. Territories are defined as areas where territorial behavior has been documented. Examples are pair bonding, nesting, or an owl found within the same area on successive surveys (resident). A brief occupation and reproductive history of each territory is provided in Table 3-33. As stated earlier, the owl breeding home range for the Almanor Ranger District is defined as a circle of approximately 4,500 acres (1.5 mile radius) surrounding the territorial site.

Habitat Use and Management Direction

Habitat suitability standards for the California spotted owl have been described in a number of sources, including the CASPO Interim Guidelines (USDA FS, 1993b), the 1999 HFQLG FEIS, and the 2001 SNFPA FEIS, 2004 SNFPA FSEIS, and the 2004 SNFPA ROD. The description of habitat attributes has remained fairly constant, mid to late successional habitat that is relatively dense (>50% canopy cover). Research has also demonstrated that spotted owls generally use stands where canopy densities are greater than 40% and where the dominant trees exceed 14 inches in diameter (USDA FS, 2001c).

The SNFPA ROD (USDA 2004a) management strategy and direction for the California spotted owl recognizes two land allocations with discretely mapped areas, the nest area or Protected Activity Center (PAC), and the home range core area (HRCA). Land allocation direction for HRCAs on the Almanor Ranger District include the 300 acre PAC plus an additional 700 acres of the best habitat available within a 1.5 mile radius of the activity center for a total of 1,000 acres. The 2004 SNFPA ROD direction allows for full implementation of HFQLG Pilot Project activities within home range core areas that are established within the HFQLG Pilot Project area until the conclusion of the Act in 2009. When the Pilot Project concludes, management direction associated with the HRCA designations will apply to the Lassen National Forest. Therefore, this analysis assesses the impacts of the proposed action and alternatives to HRCAs and suitable spotted owl habitat.

Territory and Home Range

Within the Creeks Project area, home ranges often overlap with each other, as much as 60% or more in some cases. There are 13 owl PACs (Figure 3-13), approximately 300 acres each within the project area, comprising approximately 3,900 owl PAC acres. Five of the owl territories considered in this analysis have been reproductive within the last five years and an additional two territories have been reproductive within the last decade. The territory center is based on the best status which is typically the most recent nest, pair location, or territorial individual. In most cases, the best status occurs within or immediately adjacent to the PAC. However, in the case of Territory PL013, the demography data shows that the owls appear to have moved to a PAC (PL328) to the north (Figure 3-13). Two of the PACs within the project area were established without an associated territorial owl (PL276 and PL328). As mentioned, PAC PL328 now supports the owls that were within PAC PL013, however PAC PL276 remains a non-territorial PAC. Based on the data from the owl demography study, one territory (PL215) was abandoned and re-established approximately 1.5 miles to the southeast (PL215A). The pair within PAC PL231 had also moved its nest location within the last two years to an area outside the PAC. To provide nest protection, the PAC boundaries were redrawn to include the new nest. The changes to PAC PL231 and the addition of PAC PL215A to the network were documented in a Biological Evaluation (USDA FS, 2005a).

Table 3-33. A Summary of Spotted Owl Activity 1992-2004 for Territories Affected by the Creeks Project Area

Owl Territory	Year Discovered*	# Years Non-territorial Occupancy	# Years Territorial Occupancy	# Years Reproductive
PL013**	1992	2	7	0
PL046	1990	0	6	5
PL047	1981	0	2	2
PL048	1991	1	8	3
PL049	1992	0	1	0
PL050	1981	0	9	4
PL065	1991	2	4	1
PL066	1993	2	1	0
PL069	1990	2	8	1
PL121	1989	0	6	3
PL159	1992	0	7	6
PL160	1991	3	3	1 (Failed)
PL212	1991	1	4	3
PL215***	1991	0	9	3
PL231	1991	1	6	5
PL306	1990	2	2	0
PL309	1993	2	8	0
BU050	2002	2	1	0

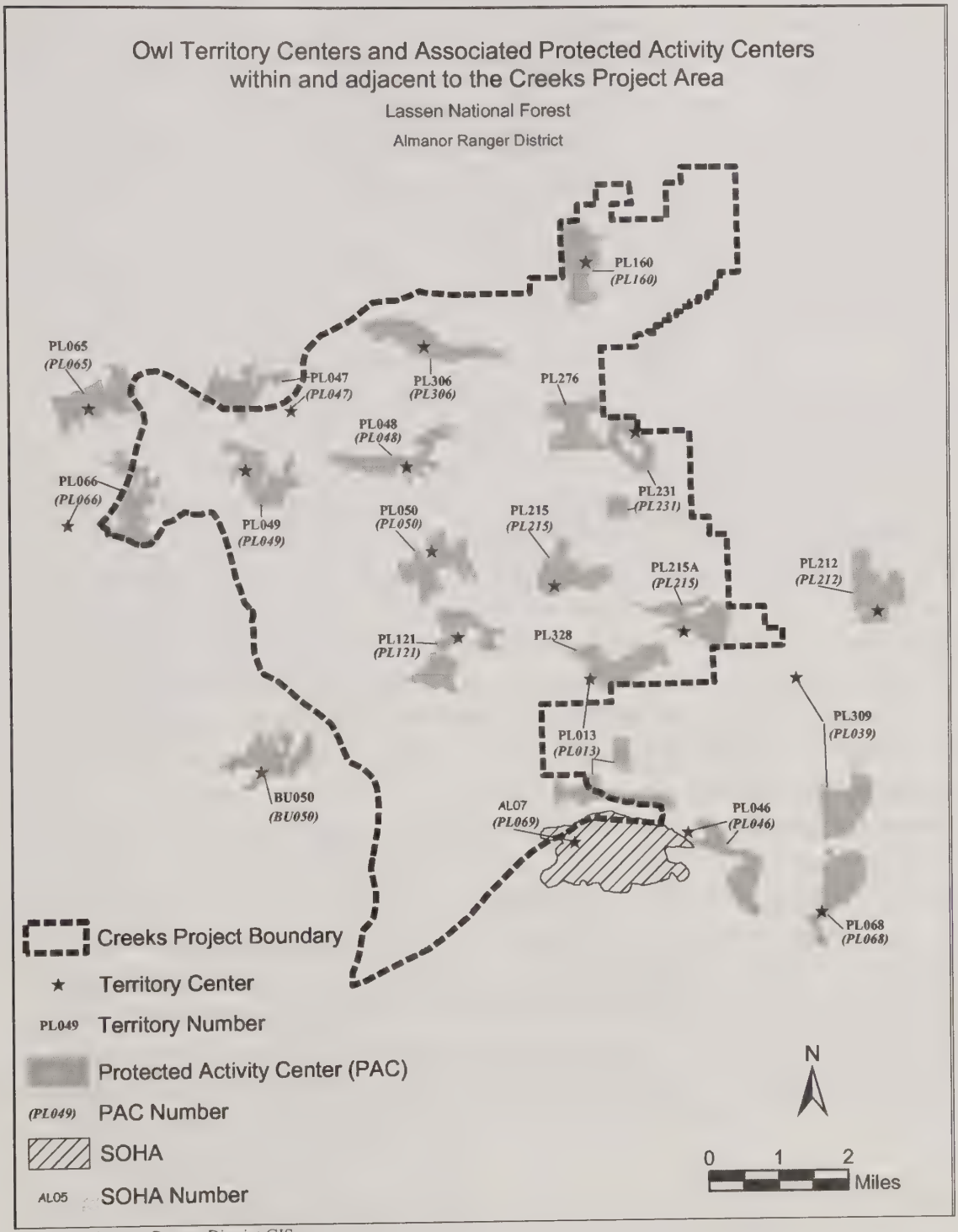
Source: Unpublished District Records and Files.

* Year of first Territorial response or behavior.

**The territory designation follows the State numbering system for California Spotted Owls. The system uses the first two letters of the County followed by the next unassigned number. In this case 18 territories are in Plumas (PL) County and 1 is in Butte County.

*** This includes both home ranges (PACs 215 and 215A) that have been occupied by this territorial pair based on data provided through the demography study.

Figure 3-13. Owl Territory Centers and Associated Protected Activity Centers within and Adjacent to the Creeks Project Area



Source: Almanor Ranger District GIS

Table 3-33 does not include Territory PL328, which has exhibited territorial behavior in the past, based on the data from the demography study. However, the territory has been inconsistently occupied by a number of differing owls and pairs. Shaw (Personal Communication 2005) reports that the territories PL328 and PL013 are variously occupied by different pairs and floaters and there is no consistent territorial behavior. Although a PAC (PL328) was established there is no record of territorial owls using the PAC during the time it was established nor is there a record of why the PAC was established in that particular location. Based on demography study data, PAC PL328 is now supporting owl pair, PL013. PAC PL013, is currently within the territories of owl pairs PL069 and PL046. It should be noted that this is somewhat speculative as there are numerous changes in individuals within the PL013/PL328 complex. Due to the highly mobile nature of the owls utilizing territory PL328, defining a meaningful territorial boundary is not possible. The table also combines PL215 and PL215a as these territories are based on the same owl pair and PL215 is considered to be an empty territory at this time. However, the effects to PL215 territory are still considered in this analysis.

By quantifying the habitat changes within the home range as a result of project actions, a risk assessment based on habitat needs as outlined by Verner et. al. (1992), Blakesley et al. (2001), and Blakesley (2003) among others can be completed. This method or derivatives of this method have been utilized for over a decade to predict potential effects and the subsequent risk of implementing vegetation management projects. While there is a plethora of data on habitat suitability with regard to spotted owls, there have been no comprehensive studies on the impacts of vegetation management activities on reproductive success, impacts to prey, and long-term viability at the landscape level within a managed landscape. Specifically, although a risk assessment can be made when projects reduce habitat within a territory below a given threshold, no data exists that permit a reasoned prediction of impacts that vegetation management activities may have when the amount of suitable habitat remains above a given threshold. As noted previously, the Plumas Lassen Administrative Study (2005) was initiated to address these management concerns. The results of that long-termed study would have a direct application of findings on this project.

The size of the home range selected for this analysis is reflective of breeding home range sizes elsewhere in the Sierra bioregion for mixed conifer forests. While a specific home range size is not discussed per se within the 2004 SNFPA FSEIS ROD, the ROD does reference an analysis size of a circle 1.5 miles in diameter around the activity center which equates to approximately 4,500 acres. Home range sizes for the California spotted owl are reported to vary between 3,000 acres (Verner et al 1992, Call 1990) for breeding pairs to as much as 12,500 acres (Verner et al, 1992) for non-breeding pairs on the east slopes of the Cascade Range. This analysis uses findings from Verner et. al. (1992) and SNFPA guidelines (USDA 2004a) in delineating spotted owl home ranges as a circle of approximately 4,500 acres (1.5 mile radius) surrounding the territorial site. A detailed discussion of home ranges and core areas is provided in the Biological Evaluation/Biological Assessment.

Nest Core

By direction, home range core areas (HRCA) are mapped for each territorial owl pair. Core areas are defined as the portion of the home range that receives disproportionately higher use (Bingham and Noon 1997, Blakesley 2005). Without telemetry data it is impossible to determine the actual core area, therefore the best available habitat surrounding the nest is designated as the core (HRCA). The SNFPA (USDA 2004a) direction for the creation of home range core areas is based on research that indicates that for a given home range, an

area of highly suitable habitat consisting of 20% plus one standard deviation of the size of the home range (Bingham and Noon 1997 in USDA FS 2001a, 2004a,).

Area of Concern

Verner et al (1992) recognized regional areas that could provide barriers for spotted owls, which were termed areas of concern (AOC). There are two areas of concern (AOC 1 and AOC 2) within the HFQLG project area (HFQLG FEIS 1999) that occur on the Lassen National Forest. AOCs were described as areas were management decisions would have a disproportionate potential to affect the spotted owl population. AOCs include areas that are bottlenecks in the distribution of owls, gaps in the known distribution, highly fragmented habitat, and areas of low crude densities of owls. The Creeks Project area does not meet the criteria of an AOC as described in Verner et. al. (1992) given that: (1) nearly 20% of the known owl territories on the Forest are found within the Creeks project area; (2) the project area does not lack of dispersal habitat or serve as bottleneck; and (3) suitable habitat is not lacking.

The concern over the AOC was augmented by a planning map constructed for the 2001 SNFPA that showed a portion of the Creeks project area within AOC 2. The maps were extremely broad and the method use to define those boundaries is unclear. A review of the vegetation within that portion of the project area that falls within the AOC strongly indicates that the map is erroneous. That portion includes part of an occupied owl territory and is dominated by suitable habitat. Therefore the mapped portion of the AOC falling within the project area does not meet Verner et al.(1992) definition of lands to be included in an AOC.

Environmental Effects

Alternative 1 - Proposed Action

Direct and Indirect Effects to the California Spotted Owl

This analysis initially reviews the impacts at the landscape level and then assesses the impacts to spotted owls home ranges to identify both short and long-term risks to the species. The analysis is complicated by the implementation of several very different prescriptions and the varied impacts of each in terms of the changes in habitat as a result of each treatment.

Verner et al. (1992), the CASPO Interim Guidelines (USDA FS, 1993b), and later Blakesley (2003) recognized two types of habitat use, foraging and nesting. Foraging habitat is defined as CWHR 4M and 4D. Foraging habitat (CWHR 4M and 4D) is the dominant vegetative feature within the project area and the proposed prescriptions are expected to have little affect on the overall amount of foraging habitat. Conversely, loss of nesting habitat (CWHR 5M, 5D, and 6) would likely have an impact due to its relative rarity within the project area although that impact and subsequent risk is extremely difficult to predict due to the scattered nature of the habitat.

Effects to Territories

The impacts to spotted owls would primarily be through the reduction in the amount and value of suitable habitat. Disturbance to individuals from project activities may occur however given the opportunity owls would have to move to suitable habitat outside treatment areas and outside a zone of disturbance, the risk of measurable direct effects to individuals, including injury, is low. As owls are primarily nocturnal foragers, it is unlikely that implementation would cause changes in foraging or behavioral patterns except where this is due to changes in habitat. Although PACs would not be treated, most of the home ranges would see a general

reduction in the amount and value of suitable habitat due to a loss of stand complexity as well as a general decline in decadence. Decadence has been demonstrated to be a key habitat feature within owl territories (USDA FS, 2001c) possibly due to the association of decadence and prey species. The DFPZs (except for CWHR 5M and 5D stands) would generally be thinned to or below the minimum canopy levels considered necessary for suitability (40% - 50%) and would affect approximately 17% of the suitable habitat within the project area. Group selections would remove most, if not all of the canopy, affecting approximately 5% of the suitable habitat. Area thinning activities would affect approximately 11% of the existing suitable habitat but would retain sufficient habitat attributes to remain suitable for spotted owls.

Impacts to nesting individuals are mitigated through the implementation of LOPs around active nest sites. Because the majority of the prescriptions would retain some level of canopy cover, the alternative would not preclude dispersal from one territory to another, nor would the treatment preclude territory development in the future although there is a potential lag time (1 to 3 decades) before a currently unoccupied home range becomes sustainable based on the current understanding of habitat needs for this species. The project would affect approximately 75 acres of nesting habitat (CWHR 5M, 5D) that is disbursed throughout the project area. However, thinning would apparently result in a net gain of nesting habitat based on projected changes in strata labels. This would imply that there is more suitable nesting habitat than is indicated by strata labels alone where inclusions of larger trees are within stands dominated by smaller conifers.

Upward changes in strata labels occur when the smaller but dominant size (in terms of basal area or stems/acre) is reduced and the larger trees become the dominate size class. The net change in the stand is a reduction of overall canopy and the related basal area. Because stand labels are not a comprehensive description of stand conditions, they cannot be used as the sole method for discerning impacts to wildlife.

There is considerable overlap between a number of group selections and other treatments as outlined in the silvicultural resources section. The effect of combining these treatments is unknown and is one of the actions being monitored under the administrative study. Since there is no data to predict the synergistic impacts of thinning and group selections combined, this analysis will not attempt to estimate the risk to the species. Instead, each action is considered separately and the actions are reviewed in their totality in terms of their impact to the individual territories and the risk to the species as a whole. It is likely that the two actions together would have a greater impact than each considered separately.

Based on the silvicultural data developed for this analysis, thinning prescriptions A, C, F, G, and H would result in lowered habitat values, but stands treated under those prescriptions would remain suitable as they would maintain the structural components most important to the owl such as multi-storied stands (where they exist), higher levels of snags and down wood and higher canopy levels. Stand heterogeneity would decline as would canopy but the declines are not expected to cause the stand to move to an unsuitable state. Prescription A removes small fuels, much of it through hand treatments, but would retain the existing overstory canopy with a resulting impact of lower habitat values only slightly through loss of structure, specifically through the reduction of snags and decadent live trees and loss of habitat associated with developing the infrastructure (skids, landings, temporary roads) needed for the project. Prescription A would have very little affect on suitable habitat as only 25% of the units being treated with this prescription have suitable habitat attributes. Prescription B is expected to reduce suitable habitat to an unsuitable condition primarily due to reducing canopies to 40% or less as well as the reductions in stand heterogeneity. Stands would become fairly uniform

with reductions in stand canopy variation and reductions in low (ground) cover such as young conifers and shrubs where they exist.

Assuming no further affects to habitat, the habitat values for area thins (prescriptions F, G, and H) and DFPZ Prescription C, would slowly improve in the next for two to three decades as canopy cover and other structural attributes naturally develop. At the end of that time, habitat values are likely to be better than if left untreated as the stand would likely increase the amount (or develop if currently absent) a second cohort of trees providing more stand heterogeneity than would otherwise occur especially within the denser, younger stands. The improvement would hasten the stands towards the desired conditions outlined for owl habitat (USDA FS 2004a). The DFPZ prescription (B) would take longer to achieve attributes that the meet minimum standards for suitability. Decadence (including snags and down woody material) would need to develop as well as an understory of conifers. It is estimated that for Prescription B, it would take 3 decades before minimum canopy closures develop. The other attributes would develop during this time as well. This would equate to 2 – 3 generations of owls that would occupy a given territory during that time.

However, the effects need to be considered in light of the changes to the habitat within each territorial home range and the impact the treatment would have on the owl. Such analysis includes a review of the changes to overall amount of suitable habitat, changes in habitat characteristics, and the effects to related concerns such as the prey base. Since recently active nest sites are protected through the PAC network, the spatial relationship between the group selections and the currently known nest sites is of lesser concern and there is no discernable direct or indirect effect to nest groves posed by this treatment beyond habitat loss within the territory. The groups would provide more heterogeneity at the landscape (project area) level and likely within most of the home ranges as well, based on the overall lack of open ground within the home ranges. The treatment does not result in areas that prevent access to adjoining suitable habitat. By design, the group selections make up less than 20% of any given stand. The small size of the groups (.5 – 2 acres) would not preclude owls from flying over or around the treated areas. While the implementation of the group selections may not result in fragmentation in the classic sense, they would reduce the value of the habitat within the stand and are likely to cause changes in the behavioral use of the territory, particularly with respect to foraging. The edge effects are likely to result in greater species richness and diversity where they occur within denser conifer stands (Burnett, 2005) providing a potential increase in prey availability.

Table 3-34 provides the amount of suitable habitat within each territorial home range potentially affected by the project. The home ranges that have had reproduction and are directly affected by the project would retain at least 1,000 acres of suitable habitat (meeting requirements post-QLG) and are above 30% suitable habitat within the 4,500 acre home range, the minimum threshold recommended by Bart (1995). Of the ten owl territories (Table 3-34) that have been most productive (3 reproductive years since 1992), six would retain more than 40% suitable habitat within the territory, three would see no change in the amount of suitable habitat although light treatment may occur in limited areas, and one (PL231) would see a 16% decrease in suitable habitat but retain approximately 33% suitable habitat within the territory. Five owl territories have had reproduction in the last five years. Of those territories, one would remain unchanged, three would retain at least 42% suitable habitat, and one would see a 16% drop in suitable habitat but retain approximately 33% suitable habitat.

Table 3-34: Treatment effects summary; California Spotted Owl Home Ranges within and adjacent to the Creeks Project Area including linkages to the Plumas National Forest.

Owl Territory	Best Status Including Year of Last Reproduction	Existing Suitable Acres FS[1] within the Home Range	Acres Treated Within the Home Range	Acres within the Home Range Reduced to Unsuitable	Post-Treatment Suitable Acres Remaining[2] within the Home Range and Percent Reduction
PL013	1996/Pair (PR)[3]	2,341	678	464	1,877 (20%)
PL046	2002/1 Young (1Y)	1,189	5	5	1,184 (>.5%)
PL047	1999/1Y	2,484	369	361	2,123 (15%)
PL048	1998/1Y	2,374	399	326	2048 (14%)
PL049	1992/PR	2,029	160	147	1882 (7%)
PL050	2002/2Y	2,198	668	294	1904 (12%)
PL065	1992/2Y	1,657	41	41	1616 (2.5%)
PL066	1999/Territorial Male (TM)	2717	35	35	2,682 (1%)
PL068	2002/2Y	828	0	0	828 (0)
PL069	1992/2Y	2,341	68	68	2273 (3%)
PL103	1992/2Y	440	0	0	440 (0)
PL121	1992/2Y	2,549	1099	689	1860 (27%)
PL159	2004/2Y	1971	93	93	1878 (5%)
PL160	1993/Failed	2,479	868	760	1719 (30%)
PL212	1992/2Y	813	9	0	804 (0)
PL215	1993/1Y	2,478	827	450	2028 (18%)
PL215A	2002/2Y	2,898	892	593	2305 (20%)
PL231	2002/3Y	1,771	498	282	1489 (16%)
PL306	1991/PR	2,873	551	542	2331 (19%)
PL309	1996/PR	869	171	61	808 (7%)
BU050	2002/PR	2,567	36	36	2531 (1%)

Source: Silvicultural records and GIS data developed for the Creeks Forest Health Recovery Project
Note that PL215 and PL215A are the same pair. The pair established a new territory in 2001 (tentatively labeled PL215A) however both territories are reported here. The original territory remains empty at this time. PL068 and PL103 do not fall within the project area but contain habitat that may serve as linkages to the Plumas National Forest. The data is provided here for consideration in the project cumulative effects.
[1]This includes only National Forest lands on the Lassen National Forest.
[2]This figure only considers federally managed lands as private lands cannot be counted on to maintain habitat within the territory. [3]There was recorded reproduction in 1976 however there is no data to verify the information.

Overall, 61% of the federal lands within the project area support suitable owl habitat. The project proposal would reduce this to 52% suitable habitat, nominally above Bart's findings for the amount of suitable habitat needed to sustain viable territories at the landscape (project area) level. Reproduction would be expected to decline somewhat over the next decade due to maintaining the territories within the threshold range cited by Bart (1995). However, barring other actions, habitat value would trend upwards particularly in areas treated with area thinnings and may develop attributes such as multi-tiered stands that would not develop otherwise due to the competition for resources.

This analysis could not find any correlation between fecundity (reproduction) and the amount of suitable habitat within each of the territories listed in Table 3-34. For example, only two territories out of five, with greater than 50% suitable habitat, have records of reproduction. The data strongly suggests that a number of factors, not just the total amount of suitable habitat, affect reproductive success and must be considered. Lee

and Irwin (In Press) reviewed Blakesley (2003), where the relationship between the amount of suitable habitat and reproductive success was weak, as illustrated in Table 3-34. This is not to say there is no relationship between suitable habitat and reproduction. Rather it is difficult to assess habitat relationships where the differences between stands are subtle and not readily described through gross measurements such as stand strata labels. Factors such as distance to water, topography, and distance from the nest tree all contribute to habitat use (Lee and Irwin In Press). The contributions these factors have on fecundity or even territorial viability is unknown and therefore cannot reasonably be used in an assessment of effects.

The group selections would completely remove suitable habitat and the loss would remain unsuitable for at least 80 to 120 years. During that time, the openings would develop conifer cover as a result of natural or artificial stocking and conifers would develop sufficient size to be considered suitable habitat. Natural process would also positively influence the amount of decadence that is a necessary habitat attribute. It is unlikely that the habitat would support nesting as the trees would not be old enough to have developed the hollows or other nest platforms that the owls utilize. The stands would eventually develop enough canopy and decadence to support foraging.

As illustrated in Table 3-34, two territories that fall wholly or partially within the project area have less than 22% of suitable habitat within the Lassen National Forest system lands in the Creeks project area. The project would affect 9 acres of suitable habitat within Territory PL121; however the habitat is within an area thin and would remain suitable. The activity would take place at the outer edge of the defined territory approximately 1.5 miles from the activity center. Territory PL309 is primarily on private lands and the Forest Service lands are at the edge of the 4,500 acre home range. The territory has no history of reproduction and the last pair status was in 1996. Two additional territories border the project area and contain less than 22% of suitable habitat for that portion of the territory within the Lassen National Forest. Territory PL103 is primarily on the Plumas National Forest, where the majority of suitable habitat resides (which is not reflected in Table 3-25 and not shown in Figure 3-413). Only the western edge of that home range is on the Lassen. The pair fledged two young in 1992 and a pair was found in 2002. The territory for PL 068 is southeast of the project area, adjacent to PL046 and fledged two young in 2002. Neither of these territories or home ranges would be affected by the Proposed Action.

Effects to Nest Core

The previous discussion reviewed the impacts to owl territories at the landscape level. Such an assessment does not provide of impacts to areas immediately surrounding the activity center (including nest sites). The literature generally agrees that productivity is positively correlated with the proportion of the analysis area having more than 50% suitable habitat and negatively correlated to analysis areas with less than 50% suitable habitat (USDA 2001a). However an analysis method to assess near nest disturbance has not received universal acceptance. Nor is there agreement as to how much suitable habitat is necessary before productivity or survivorship suffers. Ripple et al. (1991) found that the percentage of old-growth and mature stands in a 260 ha circle (approximately 650 acres) around the nest was 78% (range 51% - 100%). The percentage declined the further away from the nest core. Ripple et al. (1991) stated they did not know how much fragmentation owls could tolerate or whether the toleration varied depending on location, the quality of habitat, or length of time since timber harvest. Lamberson et al. (1992) reviewed fragmentation in northern spotted owl habitat and ran several models looking at survivability and site occupancy. While the models looked at highly fragmented

landscapes (where suitable habitat is below 25% within the territories) they did not draw conclusions on the amount of habitat needed and looked at long-term effects (75 – 250 years), the models used in Lamberson et al. (1992) indicate that some level approaching 50% is the point at which site occupancy and survivability would stabilize. Bart (1995) is often cited as setting a threshold of 30% to 50% suitable habitat to ensure long-term viability. Bart's recommendation was for a landscape approach. Bart (1995) reviewed the utility of using both a 70-acre analysis as well as a 500-acre analysis and determined that they should not be used to describe how much suitable habitat is needed around the nest as it was difficult to justify through current science.

Blakesley (2003) provided important local data in reviewing both landscape and nest core conditions. Blakesley found that examining the amount of habitat within a 203 ha core area (approximately 500 acres) was a better predictor of site occupancy than examining a larger area such as the breeding territory. Blakesley's data indicates that 50% habitat within the core area is an important threshold. While logging is mentioned as a negative impact on habitat, the data does not distinguish between the various methods of harvest (overstory removal, sanitation harvest, and the various prescriptions in the CASPO Interim Guidelines). The effects of habitat changes to northern spotted owl habitat are easier to predict as in general, clearcuts are the primary timber harvest prescription. Conversely, thinning prescriptions are highly variable and to date no research has done a good job of reviewing the effects of specific thinning prescriptions, hence the need for the PLAS. A more thorough review of the different prescriptions used in the various studies cited in this analysis would have provided important information as each prescription has a unique and often very different impact on habitat structure.

Table 3-35: Summary of Existing Conditions within Spotted Owl Nest Cores Affected by the Proposed Action.

Territory	Activity Center Status	Acres of FS Lands	Acres of Suitable Habitat	% of FS Lands Comprising the Core	% of Suitable Habitat with Core Area
PL013	PR	448	385	86%	77%
PL047	N	478	429	90%	86%
PL048	N	458	380	83%	76%
PL049	PR	500	170	34%	34%
PL050	N	415	349	84%	70%
PL069	N	500	367	73%	73%
PL121	N	500	286	57%	57%
PL160	N	457	441	96%	88%
PL215	N	500	412	82%	82%
PL215A	N	500	496	99%	99%
PL231	N	302	276	74%	55%
PL306	PR	500	457	91%	91%

Source: Almanor Ranger District GIS. * PR = Pair N=Nest

As Blakesley's data is local and much of the work is drawn from the population in the project area, an analysis method similar to the one used in Blakesley (2003) is used to predict the risk to known territories affected by project actions. Table 3-35 provides a summary of the amount of suitable habitat by territory, within ½ mile of the activity center, an area approximately 500 acres. As with Table 3-35, only National Forest

System Lands are considered in the analysis. This group is smaller than Table 3-35 as the project activities affect fewer core areas than the larger territories.

Table 3-35 indicates that 75% of the activity centers have more than 70% suitable habitat surrounding the nest or pair activity based on the vegetation data used for this analysis and 83% have more than 50% suitable habitat surround the nest. Aerial photos show that PL049 has more suitable habitat however that is located on private lands and therefore the total amount of suitable habitat available to the owl is not represented. Although the vegetation layer indicates that owl core area PL231 has 55% suitable habitat, the habitat is of marginal value and primarily consists of thinned stands with some large tree (>18"dbh) scattered throughout the stands. The owl moved from an area of relatively better habitat to a new nest site in 2002 when the nest tree fell over (Shaw 2005 personal communication).

Table 3-36 - Acres of Nest Core Affected by Treatment.

Territory	Acres Suitable Habitat	Acres DFPZ	Acres of DFPZ Suitable	Acres of Area Thin	Acres of Area Thin Suitable	Acres of Group Selection	Acres of Group Selection Suitable
PL013	385	0	0	9	3	10	6
PL047	429	107	69	0	0	39	33
PL048	380	26	2	12	4	11	10
PL049	170	0	0	0	0	18	8
PL050	349	38	2	29	1	4	2
PL069	367	59	13	0	0	14	0
PL121	286	131	41	36	9	6	4
PL160	441	39	24	0	0	4	4
PL215	412	96	12	63	21	16	9
PL215A	496	79	47	88	88	13	13
PL231	254	53	38	63	53	6	5
PL306	457	75	25	0	0	28	26

Source: Almanor Ranger District GIS

Tables 3-35 and 3-36 summarize the impacts to owl nest cores. The majority of nest cores (67%) remain above 50% suitable habitat. The project would affect more than 10% of the available suitable habitat within 4 of the territories. Of the four nest cores reduced by more than 10% loss of suitable habitat, PL047 and PL215A are at the greatest risk as the territories have been active within the last five years with reproduction in 1999 and 2002 respectively. Both territories remain above 70% therefore the risk, based on a threshold of 50% suitable habitat, is considered to be low in terms of affecting future territorial behavior due to affects of the proposed action on the core. PL121 and PL306 would see reductions of 14% and 18% respectively in the amount of suitable habitat lost within the core. PL121 has not been territorially active since 1997 and the last reproduction was in 1992 (Table 3-34). Therefore the risk of affecting territorial behavior due to the actions within the core area is considered to be low. PL306 has never been reproductive and the last territorial occupancy was in 1991 therefore the risk of affecting territorial behavior due to the actions within the core area is considered to be low. The opportunity for future territorial behavior within the core would not be precluded as core habitat within PL306 would remain above 50%.

Table 3-37: Treatment effects summary; California Spotted Nest Cores

Territory	Acres Treated	Suitable Acres Pre-Treated	Suitable Acres Post Treated	Suitable Acres after Treatment within Territory	% of Nest Core Suitable Post Treatment	% Decline in Suitable Habitat
PL013	19	9	3	379	76%	1%
PL047	146	102	0	357	71%	17%
PL048	49	16	4	368	74%	3%
PL049	18	8	0	162	32%	6%
PL050	70	4	1	346	69%	1%
PL069	73	13	0	354	71%	3%
PL121	173	53	9	242	49%	14%
PL160	43	28	0	413	83%	6%
PL215	175	42	21	391	78%	5%
PL215A	180	148	88	436	87%	12%
PL231	122	96	53	243	49%	12%
PL306	103	51	0	406	81%	18%

Source: Almanor Ranger District GIS

PL049 and PL231 would be below 50% suitable habitat post-treatment. PL049 has not had territorial activity since 1992 and has not had a reproductive pair therefore the risk of affecting territorial behavior through activities in the proposed action are considered low. PL231 has very low habitat value throughout most of its territory. Although Table 3-36 indicates nearly 50% of the core area is suitable habitat, that habitat is of marginal value due to the young age of the stands and the high amount of thinning that has occurred within the stands. Because of the poor quality of the habitat, the treatments within the nest core pose a high risk to this territory and would likely contribute to the abandonment of the territory over time.

Table 3-38 presents a risk assessment for the California spotted owl due to the direct and indirect effects of Alternative 1. The assessment looks at the actions being considered and provides a relative level of risk based on maintaining the territory or nest core within the 30% - 50% threshold described earlier. Retaining more than 48% suitable habitat is considered to constitute a low risk, retaining 38% - 48% is considered to constitute a moderate risk, and retaining less than 38% or initiation actions in a territory or nest core with less than 38% suitable habitat is considered to constitute a high risk. The risk to affecting territorial behavior is a judgment based on the relative impact to the territory and nest core and considering past activity within the territory. A low affect to territorial behavior might indicate changes in foraging with no impact to nest success while a high risk would indicate a likelihood of poor nesting success or territory abandonment over time.

There is an overall low risk to that currently active territories would be abandoned due solely to project activities, with the possible exception of PL231. The project would contribute to overall declining habitats and the ability to support owls in all past and presently active territories currently within the project area. Area thinning would contribute to long-term habitat improvement through the development of multi-storied structure which is unlikely to develop otherwise. If left untreated, it would take considerably longer to develop the structural attributes preferred by the owl, excluding canopy cover.

Table 3-38. Risk Assessment for Territories Considered in Table 3-34.

Territory	Risk to Territory	Risk to Nest Core	Risk to Affecting Territorial Behavior	Reason for Risk Values
PL013	Moderate	Low	Low	No nesting and no recent territorial behavior. Territory at threshold for maintaining reproductive pair
PL046	Low	Low	Low	Low amount of suitable habitat within territory but activities within the territory would affect 5 acres therefore direct and indirect risk is low.
PL047	Low	Low	Low	The project activities would retain nearly 50% of the territory as suitable habitat. The core area would remain above 70% suitable habitat.
PL048	Moderate	Low	Low	The project activities would retain 45% of the territory as suitable habitat. The core area would remain above 70% suitable habitat
PL049	Moderate	Moderate	Moderate	The territory has not had territorial behavior since 1996 therefore the risk is moderate although the habitat is at or below threshold (41%).
PL050	Moderate	Low	Moderate	The 12% decline in habitat may affect the ability of the territory to support the current owl pair.
PL065	Low	Low	Low	There is little change in the amount of habitat and there has been no territorial activity since 1994. No affect to the core area habitat.
PL066	Low	Low	Low	There is little change in the amount of habitat and there has been no territorial activity since 1999. No affect to the core area habitat.
PL068	Low	Low	Low	The project does not affect the territory or core area.
PL069	Low	Low	Low	There is little change in the amount of habitat and the territory remains at 50% suitable habitat. A minor affect to the core area habitat.
PL103	Low	Low	Low	The project does not affect the territory or core area.
PL121	Moderate	Moderate	Moderate	The loss of 689 acres of suitable habitat places the territory at risk of being able to support territorial birds. However no territorial activity has been recorded since 1997 reducing the risk to existing territorial birds..
PL159	Moderate	Low	Moderate	The risk for this territory is raised due to the relatively low amount (43%) of suitable habitat currently existing and recent activity. Loss will be approximately 1% of suitable habitat with no impact to the core.
PL160	Moderate – High	Low	Moderate	The territory has been recently active and the project would lead to the territory falling below 40% suitable habitat indicating a risk to maintaining a territory. Core remains about 80% suitable habitat.
PL212	Low	Low	Low	No recent territorial activity. No affect to core area and limited impact to suitable habitat.
PL215	Moderate	Low	Low	Territory currently empty. Project would lower suitable habitat to 45% risking ability to reestablish a territory. Core area retains 78% suitable habitat.
PL215A	Moderate	Moderate	Low	Territory would retain 50% suitable habitat after proposed actions. 87% of core remains suitable.

Territory	Risk to Territory	Risk to Nest Core	Risk to Affecting Territorial Behavior	Reason for Risk Values
PL231	High	High	High	Low quality habitat and low amount of suitable habitat within the core and territory. Recent nesting.
PL306	Low	Low	Low	No recent territorial activity. Territory and core remain above 50% suitable habitat.
PL309	Moderate	Low	Low	Low amount of suitable habitat (19%) within territory but no territorial activity since 1996. No affect to the nest core.
BU050	Low	Low	Low	Territory retains 50% suitable habitat and no affect to nest core.

Although Home Range Core Areas (HRCA) have been designated for all territorial PACs as directed in the 2004 SNFPA ROD (USDA 2004a), there is no management direction for HRCAs until after the conclusion HFQLG Pilot Project Area at which time, impacts to the HRCAs would be assessed. HRCA boundaries can be redrawn if sufficient suitable habitat is available. Table 3-39 indicates the current impacts to the HRCA.

Table 3-39. Summary of Affects to 1,000 Acre HRCAs within the Creeks Project Area

HRCA	Acres Affected	Acres Changed to Unsuitable	Acres of HRCA Remaining Suitable	Percent Reduction in Suitability
PL013	213	129	871	12.9%
PL047	203	43	957	0.4%
PL048	296	250	750	25.0%.
PL049	54	45	955	4.5%
PL050	384	221	779	22.1%
PL065	5	5	995	0.5%
PL066	14	14	986	1.4%
PL121	430	381	619	38.1%
PL159	27	27	973	2.7%
PL160	331	297	703	29.7%
PL215	499	227	773	22.7%
PL231	423	253	747	25.3%
PL306	244	219	781	21.9%
PL328	163	124	876	12.4%

Overall, the link between project actions and the risk to the species is uncertain. As Lee and Irwin (In Press), Blakesley (2003), and others have pointed out there appears to be a correlation between the amount of suitable habitat and long-term territorial fecundity. However that relationship is far from clear, especially in habitats that have a low degree of variation and where treatments result in habitat reductions such as with the area thinnings rather than a complete loss of habitat as with a clearcut. The data has shown a marked decline in reproductive territories and this project adds further risk to reproduction and long-term territorial viability through a loss of habitat combined with a reduction in habitat value as described earlier. As mentioned many of the factors that may affect the spotted owl are issues that have not been studied such as the effects of forest

management actions in territories that have sufficient habitat to remain viable. Those unknown impacts include the spatial placement of group selections, large area thins, and treatment of a large percentage of the home range while retaining suitable habitat.

Impacts to Prey Species

The previous discussion centered on the impacts to the owls and their habitat. The impact to prey base must also be considered. Spotted owls feed on a variety of prey items year-round, but tend to focus on a few species as primary components of their diet. Northern flying squirrels (*Glaucomys sabrinus*) in coniferous forests and wood rats (*Neotoma spp*) in low elevation oak-woodlands and deciduous riparian areas form the majority of diet. The Lassen National Forest population relies almost exclusively on northern flying squirrels (Weathers et al. 2001, Waters and Zabel, 1995, Williams et al. 1992), especially during highly reproductive years. Munton et al. (2002) found that the second largest component of spotted owl diet across all vegetation types is pocket gophers (*Thomomys spp.*).

The prey composition can have an effect on the type of habitat used by the owl. For example, woodrats and a number of other rodents prefer shrubs, while flying squirrels reside in conifers. The size of the home ranges can also be affected by the choice of prey. Williams, et al. (1992) found that where woodrats are the main prey, home range sizes are considerably smaller. This is thought to be a simple matter of energetics; woodrats are larger and therefore provide more food (energy) per successful hunt, requiring less habitat to meet dietary needs.

The flying squirrel is nocturnal and arboreal and therefore it is difficult to observe. Consequently, little is known about the specifics of its life history (Carey et al. 1997). There have been relatively few studies done on this species and most of the studies that have been done were completed in the Pacific Northwest. In one local study, Waters et al (2000) found that while there was a significant difference in flying squirrel populations between "old-growth" stands and shelterwood cuts, there was no significant population difference between "old-growth" and mature stands, and Waters and Zabel (1995) found that the average flying squirrel density was about 43% higher in late-seral red and white fir stands than in fir stands that were 100 years old. However, Waters et al. (2000) points out that differences between habitat and management types varies between studies. Carey et al. (1997) found that there were significantly higher numbers in "old-growth" Douglas-fir stands when compared to managed stands. Conversely, Rosenburg and Anthony (1993) reported that there was no significant difference in flying squirrel population size between young and "old-growth" stands. A number of factors play a role in habitat suitability which may be reflective in the studies cited here. In addition to stand density, flying squirrels have been positively correlated with stand size (areas greater than 50 acres of suitable habitat), north facing slopes or islands with a cool, mesic environment. Interestingly, Waters and Zabel (1995) concluded that while on the average more flying squirrels were found in older stands, the habitat value of older stands (based on animal weight) provided only slightly better habitat value than did the younger stands.

Truffles, or subterranean fungi, provide the main food source for flying squirrels (as well as for other small rodents such as mice and voles). Therefore, project impacts on fungi's should also be considered when considering impacts to owls and their prey. Waters et al (2000) reported that they found no statistical association between down woody debris and truffle abundance. They did find that truffle abundance was lower in shelterwood stands when compared to "old-growth" or mature forests and that was attributed to the ground

disturbance associated with harvest in addition to the tractor piling of woody debris that occurred after harvest. Underburning did not appear to have an effect on truffle abundance.

The literature indicates that the proposed project would have very little affect on flying squirrel or other prey base populations overall. The thinning, even within the DFPZs would sustain sufficient canopy to provide suitable habitat for flying squirrels. Truffle abundance is likely to decline particularly within skids or other areas of concentrated activity. The methods of thinning within the study areas (Waters and Zabel, 1995) reported to have a measurable affect on flying squirrel populations was heavier (leaving a much more open canopy) than that proposed for this project. The follow-up treatment that was used within the study areas which affected truffle abundance, such as site preparation activities (tractor piling), would not occur. Recent improvements in harvesting equipment and methods now employed during harvest also reduces ground pressure and many areas that are treated would not result in detrimental impacts to truffles.

Studies on northern spotted owls have indicated that spotted owl reproductive success may be linked to prey availability. Spotted owls have low metabolic demands and the energy needed to survive and rear young are low compared to other species. Weathers et al. (2001) reported that an adult owl needs one flying squirrel every 1.8 days for its own survival. With such minimal food demands, prey species populations would have to substantially decline to negatively affect owls. North et al. (2000) ran a short-term study counting cone-crops and truffle availability as an estimate of prey availability and correlated the results with spotted owl reproductive success. No correlations of nest success and prey foodstuffs were discerned. A study by Rosenberg et al. (2003) indicated that prey availability is not generally a limiting factor over time. Based on the overall impact to the main prey base and the lack of data indicating a strong correlation between prey base and reproductive success, it is unlikely the changes to the habitat preferred by prey species would result in measurable impacts prey populations within the identified territories.

Summary of Effects

The project affects nearly 20% of the known owl territories on the Forest and results in declines of up to 30% of the available suitable habitat within a given territory. The analysis presumed DFPZs to reduce suitable habitat to unsuitable. Area thins would retain the attributes considered necessary for suitability and likely provide for long-term improvements in the suitability of the stand due to expected an increased multi-layered structure. Because a number of factors that influence reproductive efforts, it is difficult to determine what direct role this project would have as the project does not eliminate habitat but rather reduces the habitat to some level that is not readily used by owls. It is likely however that the project would have an adverse affect on reproduction but the change is likely to be masked by annual variation in reproduction caused by weather, changes in prey, or other natural phenomenon.

Although reproduction may decline, adverse impacts to individuals are unlikely. Nest sites would be protected through the PAC and limited operating periods. Owls would be able to readily move away from disturbance.

No research has been done that indicates whether or not thinning such as DFPZs is sufficient to affect behavioral changes resulting in a "fragmentation" effect of the habitat or whether the habitat is merely used less than expected. This data would hopefully be part of the overall findings within the PLAS.

The treatment is not likely to directly affect individual other than disturbance. The project increases the risk that active territories would decline especially in territories where less than 40% suitable habitat remains

after treatment particularly in territories PL231 and PL160 where treatments would affect a substantial portion of the existing habitat through DFPZ construction. Those territories that have less than 40% suitable habitat may maintain presence within the territory (due to site fidelity) but those territories are unlikely to be reoccupied by owls one the territory is empty. The risk to territories with 40% or greater habitat is largely unknown and difficult to predict with any level of accuracy. The landscape retains more than 50% suitable habitat after treatment, slightly above the threshold set by Bart (1995) and the retention of 40% is the mid-point of the range. A risk assessment is further complicated by the fact that several of the territories with greater than 50% suitable habitat within the breeding home range have no history of reproduction (PL066 and PL306) or last reproduced in 1992 (PL069), yet the territories remain active. Based on the history of the owls within the treatment area, there is a slight risk of territory abandonment for owl territories with greater than 40% suitable habitat. There is a moderate risk that empty territories (now or in the future) would not reestablish where suitable habitat is maintained above 40% within the breeding home range. In all cases there is a moderate risk that reproduction would decline due the project actions for several decades until suitable habitat attributes improve throughout the project area.

Cumulative Effects to the California Spotted Owl

The cumulative effects to California spotted owl is illustrated in Figure A-7 (Appendix A). There are two levels considered for cumulative effects. The first consideration, the potential for declines in nesting success (the number of young produced annually), must be considered at the Forest level. The second area of risk is to owl territories, that is the risk that the number of owl territories would decline (secondarily affecting nesting attempts and the ability to maintain or increase the current population within the project area). The analysis area considered for territorial cumulative effects extends to the point at which no direct or indirect effects are discernable and therefore by definition would not act cumulatively with other actions. The home ranges considered are outlined in Table 3-34 and extend to territorial home ranges outside the project area at which point no further direct or indirect effects were noted. As discussed earlier, the size of the project area lends itself to a landscape or watershed level assessment.

The owl territories affected by the project comprise approximately 20% of the overall Forest total. Table 3-33 provided an overall assessment of reproductive status of the territories. On the Almanor Ranger District there have been approximately 69 active (known) nest sites within the last five years and approximately 111 known nest sites within the last decade. There have been 10 active nests within the last 5 years and 18 active nests within the last decade within the project area, or 14% of the last 5 years and 16% of the decadal total for owl nesting on the District. Since the Almanor District contains the majority of owl territories, the data indicates that the project area contributes substantially to the number of juveniles over time. There is a moderate risk that the project would have an impact to nesting and that impact would cumulatively act to reduce the overall nesting success on the District and hence the Forest. However the amount and extent of the cumulative effect is not predictable and the impact is likely to be limited to less than three decades as habitat attributes within the stand improve. Variables such as weather, natural impacts such as fire, future unknown projects, and the individual response of the owls within the project area and elsewhere cumulatively add to these factors, making a reliable risk assessment difficult if not impossible. As outlined in Table 3-34, most of the territories are within the 30% - 50% threshold cited by Bart (1995) even after treatment. However if future

impacts occur (such as fire, large scale beetle attacks or future activities) habitat amounts could be quickly taken below the minimum (30%) threshold, resulting in a potential abandonment of the territory.

Past vegetation programs (Appendix A,) have resulted in either loss of suitable habitat (stands taken below 40% canopy) or reduction in habitat value (thinned to 40% to 50% canopy cover) through reductions in canopy and stand complexity. Habitat reductions were greatest in areas These treatments have led to the current conditions outlined on Table 3-2. All of the territories in Table 3-34 have had some level of treatment within the last 20 years with varying impacts. The impact to the territories was reviewed where data was available however no clear cause and effect correlation can be made in most cases. While it is recognized that approximately 12,000 acres of treatment affected 14 territories within the project area, the treatment prescriptions were highly variable. For example, projects such as the Castle Rocks and Lost Tom projects of the 1970's and 1980s utilized clearcut and overstory removal prescriptions which clearly removed suitable habitat attributes. Future sales designed under the CASPO interim guidelines reduced suitability to minimal standards rather than totally eliminating habitat. Many of the territories that were abandoned in the mid 1990s may have been reacting to earlier activities rather than responding the effects of sales generated under CASPO prescriptions. Some impacts are obvious. Territory PL047 was abandoned after the nest stand was logged during the Ruffa Timber Sale in 1999. However most nest stands have remained intact making an association with a given action very difficult. Table 3-40 provides a cumulative list of activities that have occurred within the known owl territories. Several caveats must be considered in interpreting the data. First, many of the acres that have been treated overlap with neighboring territories. Also the acres of treatment reported in Table 3-40 include areas where more than one treatment may have occurred such as a PSS followed by a SSS or FRS (in the case of the Storrie Fire) therefore the figures do not represent a totality of acres that have been harvested within the territory. The data does provide a reasonable indicator of the amount of activity within the territory as a result of activities that have occurred within the project area as reported in Appendix A.

Table 3-40. Pre-Existing Acres of Treatment by Territory

Territory	Acres of Treatment
BU050	97
PL013	1,207
PL046	750
PL047	2,142
PL048	2,075
PL049	1,550
PL050	1,891
PL065	567
PL068	824
PL069	955
PL103	295
PL121	2,107
PL159	733
PL160	2,000
PL212	126
PL215	1,309
PL215A	968
PL231	1,236
PL306	2,325
PL309	433

Source: Almanor Ranger District GIS

A review of the GIS layer and tables that are reported in the vegetation section of this analysis was completed to review the amount and type of impact for the territories considered in this analysis (Table 3-30). In some cases, stands may receive multiple entries so the figures are not necessarily the total acres treated within the project area but rather, are reflective of the relative amount of disturbance.

More importantly, the figures do indicate the relative changes to habitat within each of the stands and the loss of important habitat characters. Two critical components to owl habitat are a multi-layered canopy and decadence, particularly within large trees. As noted on Table 3-30 within the vegetation discussion, all treatments lower the amount and quality of these two habitat characteristics and have done so over approximately 16,600 acres (50%) of the project area. Not all treatments are equal in their affect (as described within the silvicultural discussion). Thinnings are less of an impact than shelterwood or OSR prescriptions but still reduce the multi-layered structure and impact decadence. FRS treatments are seen as providing a minor positive affect as they tend to restore canopy faster on landscapes where suitable habitat has been lost or severely reduced by fire.

The actions, along with similar habitat changes on the private lands, would act cumulatively with the Proposed Action to reduce the overall habitat value within the project area for California spotted owl. At this point in time, however, most of the territories contain at least 32% of suitable habitat, meeting the minimal

standards for viable territories as described by Bart (1995). The actual amount of suitable habitat within most of the territories increases if private lands are considered. One territory that would be impacted by current activities on private lands in association with the proposed action is PL231. The majority of quality habitat remains on private lands which are currently being logged. The remaining habitat on federal lands is minimally suitable and it is unlikely that regardless of the proposed actions, the territory would remain occupied much less reproductive.

The Storrie Fire affected large portions of areas managed as spotted owl habitat areas (SOHA) and spotted owl protected activity centers (PAC). Table 3-41 provides a summary of the effects. The effects that were considered were those known at the time and did not consider future impacts such as continued mortality.

Table 3-41. Summary of Storrie Fire Affects on California Spotted Owl Land Allocations

Management Type	Number	Level Of Effect (Habitat Loss)[1]
SOHA	AL05	Moderate – High (80%)
SOHA	AL09	Moderate – High (35%)
PAC	PL013	Moderate – High (15%)
PAC	PL309	High (95%)
PAC	PL046	High (75%)

Source: Biological Evaluation for the Storrie Fire Realignment; Protected Activity Centers and Spotted Owl Habitat Areas 2001.

[1]This includes loss of habitat from the fire as well as anticipated loss due to insect, disease, and other fire-related mortality.

Because the SOHAs contained relatively little suitable habitat, they were deleted from the overall land allocation for spotted owls as was allowed under direction at that time. The PACs were realigned to incorporate better habitat. This met direction to realign PAC boundaries where it is deemed necessary due to new information. The fire did not necessarily eliminate the habitat, but in most cases the initial mortality was sufficient to cause concern that the best habitat around the nest area was no longer encompassed by the PAC. There were a number of areas within the Storrie Fire where suitable habitat was lost. The fire initially ran in a northeast pattern along the border between the Lassen and Plumas National Forests. This area was burned extensively and contained large stands of highly suitable habitat. Although there were no records of owls, it is highly probably that territories were lost, as well as a corridor linking the Feather River canyon to the higher elevation.

Monitoring of conifers within the Storrie Fires area has shown continued mortality due to fire effects, either due to the effects of cambium scorch, insect attacks, or both.

The Storrie fire not only affected the Lassen but also suitable habitat on the Plumas National Forest. The loss of suitable owl habitat may have affected an important link between the two forests and therefore projects that further exacerbate loss of habitat would have a cumulative effect in further isolating the Lassen population from the Plumas. Table 3-34 identified two territories adjacent to the project area that overlap with the Plumas National Forest and may serve to link the Plumas owl population to that of the Lassen National Forest. As shown in Table 3-34, the project would not affect the shared territories and therefore the project would not be likely to affect the connectivity between the two forests. Hence, the linkage between the two forests remains intact.

Other projects, such as the ongoing range management program and wind throw salvage (Adams and Eagle) are unlikely to provide further cumulative effects as they would not affect habitat values for spotted owls. The Willow Forest Health Recovery Project, currently being planned may affect two home ranges

considered in this analysis, PL065 and BU050. The extent of the effects is unknown at this time as the treatment areas have not been fully identified. The risk of cumulative effects to the reproductive potential on the District is considered low as PL065 has not been reproductive since 1992 and territory BU050 has not been reported to support nesting although more than 50% of the territory is suitable habitat.

The direct and indirect effects section assumes that many areas proposed for thinning would eventually improve in habitat value as canopy cover increases and decadence attributes improve. However, planned maintenance activities within the DFPZs would limit some of this improvement and, if carried out, habitat value may improve only slightly due to continual thinning of the understory and removal of snags, down logs, and ground vegetation.

Many of the territories overlap with territories on the edge of the project area providing a linkage to habitat beyond the project area. As the treated territories would remain viable based on the current understanding of owl habitat requirements, this project would pose little risk to the network across the landscape and within the Forest as a whole.

The SNFPA (2004) considered the actions under the HFQLG program and determined that if the project met the criteria analyzed in the HFQLG FEIS and the SNFPA Supplemental FEIS (2004) then those actions would not jeopardize species viability.

Alternative 2 - No Action

Direct and Indirect Effects to the California Spotted Owl

This alternative would have little immediate impact to the species. Stands are currently of moderate foraging habitat value and very little of the project area has high quality nesting habitat, despite the reproductive record. It would take several decades before habitat values improve through the natural growth and development of coniferous stands. In the denser stands, habitat values may not reach a point of providing high habitat quality as competition would slow conifer growth and is likely to result in an increase in mortality. Of particular concern is mortality within the larger trees. The development of a multi-storied stand would be slowed and based on the conditions of many stands (single cohorts), that particular habitat feature may not develop without some stand altering activity such as fire or mortality from insects, drought or a combination of factors.

Dense stand conditions may result in an increase in conifer mortality, predominantly among the larger trees that are at a greater risk (due to increased competition for resources). The actual risk is unpredictable as the level of risk is directly tied to stochastic events such a weather and fire. The increase in conifer mortality could indirectly benefit the owls, as the increased decadence would have a positive affect on prey base numbers and overall habitat values.

The HFQLG Pilot Project was developed in part to test whether certain landscape treatments are effective in reducing the effects of stand replacing fires (HFQLG FEIS 1999). If successful, the treatments would reduce the impact to suitable habitat for this species. To date, there have been no large fires on which to base the effectiveness of the treatment and since fires are not predictable in space or time, there is no basis on which to compare not implementing the project.

Cumulative Effects to the California Spotted Owl

The area considered for cumulative effects to California spotted owl is illustrated in Figure A-7 (Appendix A). Past actions (Appendix A)have strongly affected not only the amount of suitable habitat but also the

quality of the habitat. Treatments such as overstory removal as found in the Castle Rocks area, clearcuts as found on the east side of the project area, have reduced the amount of suitable habitat within the project area. Thins designed under the CASPO Interim Guidelines (USDA 1993) reduced many areas of foraging habitat to unsuitable but did retain a sufficient number of trees to allow the development of suitable habitat within 1 – 3 decades, depending on the stand conditions at the time of thinning. Examples of those treatments are the Ruffa and Shanghai sales (thin from below), (Table 3-30) completed in the mid-90s and the Lost Lake Timber Sale, currently being completed.

Logging on private lands is currently affecting at least one territory within the project area, PL231. That territory has approximately 1771 acres of habitat that is considered suitable based on the GIS coverage used in this analysis. Much, if not all of the habitat has been thinned within the last 2 decades and is only marginally suitable. Considerably more suitable habitat is found adjacent to the current nest site, however that is being harvested and it is unclear as to whether the private lands would continue to provide habitat attributes.

The current direction attempts to merge maintaining and promoting late seral habitat attributes in addition to addressing fuels issues. This alternative would cumulatively act with current direction to facilitate the forest habitats within the project area towards dense, mature habitat attributes. This would continue a vegetative trend that reduces the lowest trophic levels and limits landscape heterogeneity in the absence of natural phenomenon.

Alternative 14

Direct and Indirect Effects to the California Spotted Owl

The effects to the California spotted owl is similar to those discussed in Alternative 1 however there are minor changes that reduce the impacts to several of the territories affected by the project. Table 42 outlines the acres of treatment and the changes from suitable to unsuitable within the territories under this alternative. This may be compared to Table 3-34 in Alternative 1 for a review of the differences.

Overall, the changes to the breeding territories due to this action are very similar as Alternative 1 therefore the impacts and subsequent risks would be similar. There would be substantially less impact to two territories, which addresses two of the issues driving this alternative, impact to spotted owl territories and affects to the portion of the project that was identified as being within Area of Concern 2.

The prescription change to PL160 not only lower impacts to the breeding territory (6% reduction in impacts to suitable habitat) but also retains the majority of suitable habitat within the mapped area of concern as suitable. The selected alternative would retain key habitat elements as suitable and minimizing the likelihood that the project would expand the area of concern as described by Verner et al (1992). The risk to the species from impacts to the territory would remain moderate (Table3-38) as the territory would be composed of 42% suitable habitat. However this does lower the risk of affecting the territory from Moderate – High downward to Low - Moderate.

Table 3-42. Treatment effects summary; California Spotted Owl Home Ranges within and adjacent to the Creeks Project Area including linkages to the Plumas National Forest. Alternative 14.

Owl Territory	Best Status Including Year of Last Reproduction	Existing Suitable Acres FS[1] within the Home Range	Acres Treated Within the Home Range	Acres within the Home Range Reduced to Unsuitable	Post-Treatment Suitable Acres Remaining[2] within the Home Range and Percent Reduction
PL013	1996/Pair (PR)[3]	2,341	662	449	1,892 (19%)
PL046	2002/1 Young (1Y)	1,189	5	5	1,184 (>.5%)
PL047	1999/1Y	2,484	369	358	2,120 (14%)
PL048	1998/1Y	2,374	398	316	2058 (14%)
PL049	1992/PR	2,029	159	146	1883 (7%)
PL050	2002/2Y	2,198	659	285	1913 (12%)
PL065	1992/2Y	1,657	35	28	1629 (1.7%)
PL066	1999/Territorial Male (TM)	2717	35	35	2,682 (1%)
PL068	2002/2Y	828	0	0	828 (0)
PL069	1992/2Y	2,341	66	66	2275 (3%)
PL103	1992/2Y	440	0	0	440 (0)
PL121	1992/2Y	2,549	1081	667	1882 (26%)
PL159	2004/2Y	1971	93	61	1910 (3%)
PL160	1993/Failed	2,479	868	585	1894 (24%)
PL212	1992/2Y	813	9	0	804 (0)
PL215	1993/1Y	2,478	808	433	2028 (18%)
PL215A	2002/2Y	2,898	889	590	2308 (20%)
PL231	2002/3Y	1,771	487	189	1582 (11%)
PL306	1991/PR	2,873	550	510	2363 (18%)
PL309	1996/PR	869	171	61	808 (7%)
BU050	2002/PR	2,567	36	36	2531 (1%)

Source: Almanor Ranger District GIS This includes only National Forest lands on the Lassen National Forest.
[2]This figure only considers federally managed lands as private lands cannot be counted on to maintain habitat within the territory. [3]There was recorded reproduction in 1976 however there is no data to verify the information.

The selected alternative also substantially reduces the impacts to Territory PL231. The prescription would eliminate the group selections within the area thin adjacent to the nest stand and would retain those groups as untreated areas, increasing stand heterogeneity and retaining some of the larger components within the stand. While Alternative 14 would retain treated habitat as suitable for areas immediately around the nest, the value of that habitat is already marginal therefore the impact to the stands in terms of suitability is unknown. It is possible that the owl pair occupying the territory may eventually abandon the site. It is highly improbable that the territory would be reoccupied if the territory were to become vacant. The treatment would have overall benefits for future habitat, however. The stands being treated within the DFPZ portion are generally composed of dense pockets of trees surrounded by very open areas. The thinning would accelerate the development of a large tree component and provide some improvement to the overall structure through improving the potential for younger trees to develop as an understory. The retention of leave islands within the DFPZ and the area thin (previously identified as group selections) would retain dense pockets of suitable habitat. As with other treatments, it may take 1 – 3 decades before measurable habitat improvements are attained.

Tables 3-42 and 3-44 outline the impacts to areas identified as owl nest or activity cores in Alternative 1 (Tables 3-36 and 3-37) and reflect the changes included with Alternative 14. As with the previous table, Tables 3-43 and 3-44 can be compared to the Tables in Alternative 1 to provide a comparison in the difference of affects to specific nest cores.

Table 3-43. Acres of Nest Core Affected by Treatment.

Territory	Acres Suitable Habitat	Acres DFPZ	Acres of DFPZ Suitable	Acres of Area Thin	Acres of Area Thin Suitable	Acres of Group Selection	Acres of Group Selection Suitable
PL013	385	0	NA	9	3	10	6
PL047	429	107	69	0	0	39	33
PL048	380	26	2	12	4	11	10
PL049	170	0	NA	0	NA	18	8
PL050	349	38	2	29	1	4	2
PL069	367	59	13	0	NA	14	0
PL121	286	131	41	36	9	6	4
PL160	441	39	24	0	0	4	4
PL215	412	96	12	63	21	15	8
PL215A	496	79	47	88	88	13	13
PL231	254	53	38	63	53	1	0
PL306	457	75	25	0	0	28	26

Source: Almanor Ranger District GIS

Table 3-44. Treatment effects summary; California Spotted Nest Cores

Territory	Acres Treated	Suitable Acres Pre-Treated	Suitable Acres Post Treated	Suitable Acres after Treatment within Territory	% of Nest Core Suitable Post Treatment	% Decline in Suitable Habitat
PL013	19	9	3	379	76%	1%
PL047	146	102	0	357	71%	17%
PL048	49	16	4	368	74%	3%
PL049	18	8	0	162	32%	6%
PL050	70	4	1	346	69%	1%
PL069	73	13	0	354	71%	3%
PL121	173	53	9	242	49%	14%
PL160	43	28	0	413	83%	6%
PL215	175	42	22	392	78%	5%
PL215A	180	148	88	436	87%	12%
PL231	116	92	92	276	55%	0%
PL306	103	51	0	406	81%	18%

Source: Almanor Ranger District GIS

The only substantial change to nest cores (when compared to Alternative 1) is within the nest core for territory PL231. The prescriptions used for this Alternative would retain all currently suitable habitat however

there would be some level of activity in 92 acres of the nest core (approximately 13% of the 500 acre nest core including private lands). As with the breeding territory, the risk to the pair is considerably lower with this alternative (low- moderate) (when compared to the proposed action). As with the territory in general, there would be long term benefits due to improvements within the stand in terms of accelerating the growth of trees and an understory for future habitat needs. The risk assessment made in Alternative 1 for this species is therefore applicable to the territory with the caveat that there are definite benefits and a lower risk in treating the PL231 nest core under this alternative (expediting the development of suitable stand conditions).

Table 3-45 outlines changes to the HRCA lands that would be considered after the conclusion of the HFQLG Pilot Project. While there is no direction for HRCAs within the lands covered under the HFQLG FEIS (1999a) changes are tracked for analysis at the end of the pilot project.

As with the previous discussions there would be very little change to HRCAs when compared to Alternative 1 except for PL160 and PL231 which would retain considerably higher percentages of the HRCA as suitable habitat compared to Alternative 1.

Table 3-45. Changes to Home Range Core Areas under Alternative 14

HRCA	Acres Affected	Acres Changed to Unsuitable	Acres of HRCA Remaining Suitable
PL013	213	129	871
PL047	203	40	960
PL048	296	196	804
PL049	54	45	955
PL050	384	118	882
PL065	5	2	998
PL066	14	14	986
PL121	430	376	624
PL159	27	27	973
PL160	331	205	795
PL215	499	214	786
PL231	423	144	856
PL306	244	113	887
PL328	163	124	876

Source: Almanor Ranger District GIS

Cumulative Effects to the California Spotted Owl

The cumulative effects to California spotted owl is illustrated in Figure A-7 (Appendix A). The cumulative effects for the selected alternative would be essentially the same as for Alternative 1 for all territories except for PL160 and PL231. The cumulative effects would be limited within territory PL160 due to the lower impact to suitable habitat, however all other cumulative effects discussed in Alternative 1 would remain applicable. There may be fewer impacts to Territory PL231 from actions in this alternative, but actions currently on-going on private lands adjacent to the nest grove jeopardize retention of an active territory. The likelihood of maintaining an active territory within PL231 is considered low due primarily to the cumulative impacts of past

actions on both private and Forest Service lands acting cumulatively with current actions on private. This alternative would further add to the overall decline of habitat quality in the short term even though treated suitable habitat would remain minimally suitable. Prescription E would lead to improved habitat conditions within 1 decade and the federal lands within the nest stand would provide moderate quality foraging habitat within 2 – 3 decades as decadence and canopy cover increase.

Northern Goshawk

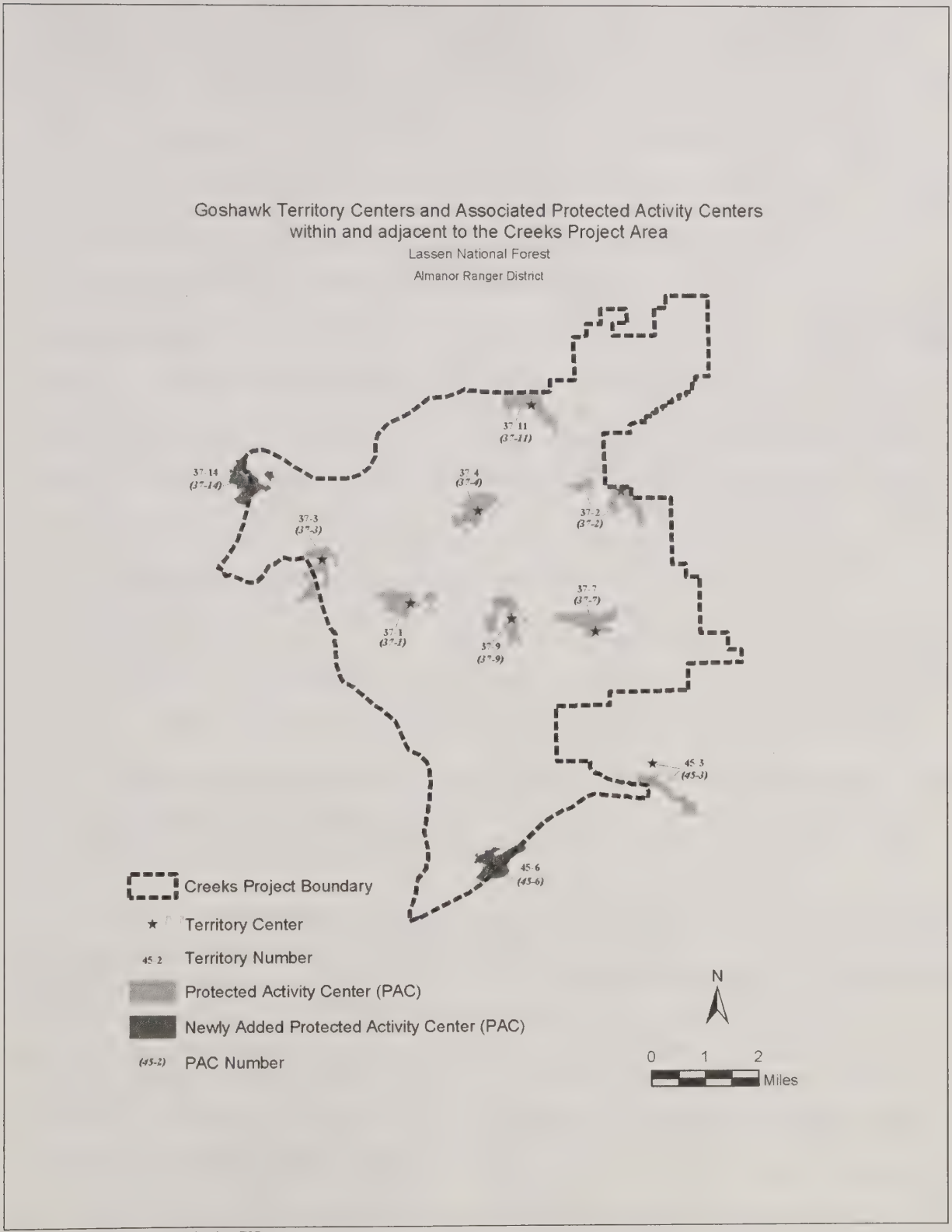
Affected Environment – Current Condition

The Forest has approximately 105 known goshawk territories, of which approximately 58 are on the Almanor Ranger District. Each territory has been allocated a 200 acre PAC in accordance with the 2004 SNFPA direction. There are seven northern goshawk PACs within the project area consisting of approximately 200 acres each (see Figure 3-14), comprising approximately 1,400 acres of protected nesting habitat. One additional PAC borders the project area to the southeast. Five of the territories have been reproductive within the last 5 years and the remaining two have been reproductive within the last decade. Goshawk protected activity centers (GPACS) are placed around the known activity centers (nest sites) and incorporate the best available habitat. The GPACs are composed primarily of suitable nesting habitat (CWHR 4M. 4D, 5M, and 5D) unless there is insufficient habitat. Lack of sufficient suitable nesting habitat to incorporate into a GPAC, however, is rare. A full historical record of reproduction is unknown, as the territories are not fully surveyed each year as occurs with spotted owls. The current status of the species within the project area was reviewed and no changes in the goshawk PAC status appears to be warranted at this time based on surveys conducted in 2002 and 2004.

Suitable habitat for the goshawk is highly variable. Local data (Richter and Callas 1999; unpublished District files and documents2005) as well as the literature indicates that the habitat preferences are dictated by the habitat available (USDA FS, 2002a). While there are some commonalities, local vegetation data suggests that each territory can have a wide range of vegetative attributes. However, the literature does indicate that nest sites are strongly associated with stands greater than 60% canopy cover. Locally, 80% of the known nests are within stands exceeding 60% canopy cover and the majority of those exceed 80% canopy cover (Richter and Callas 1999). Outside of specific nesting needs, goshawks are best described as habitat generalist and most habitat models reflect a preference for a heterogeneous landscape, reflective of a highly diverse prey base. Management activities that change the landscape do not necessarily preclude a rich population of goshawks. For example, Woodbridge and Detrich (1994) state that even though their study area was fragmented due to extensive timber harvest there was a high density of goshawks. A full discussion of habitat and behavioral characteristics and preferences is provided in the Biological Evaluation prepared for the HFQLG FEIS (USDA FS, 1999b).

The data gathered from nest sites on the Almanor Ranger District show that the vast majority of nests are within stands classified as CWHR 3D, 4D, and 5D. Less than 15% of the nests occur within CWHR 3D but such stands can provide suitable nesting habitat especially if there are inclusions of larger trees within the stand. Based on Table 3-2 approximately 20% of the project area is comprised of stands that would meet the canopy closure criteria (greater than 60% canopy cover) for goshawk nest sites.

Figure 3-14. Goshawk Territory Centers and Associated Protected Activity Centers within and adjacent to the Creeks Project Area



Source: Almanor Ranger District GIS

Environmental Effects

Alternative 1 - Proposed Action

Direct and Indirect Effects to the Northern Goshawk

Reynolds et al. (1992) described goshawk home ranges as consisting of the nest area (one 30 acre site with two alternate sites), the 420-acre post-fledgling area (PFA), and the foraging area (5,400 acre). The use of habitat in this manner appears to be a commonality for this species throughout its range although the composition of the vegetation within territories can be highly variable. The models used for this analysis are based on Reynolds et al. (1992) and provide a means to assess the condition of the area surrounding the nest sites and the larger area (PFA) that are important for juvenile dispersion once they leave the nest. The models incorporate the importance of large overstory trees but also include a means for assessing the requisite landscape heterogeneity desired by this species.

Table 3-46 provides a summary of activities within each of the seven nest groves and PFAs that would be affected by project activities. For purposes of this analysis, PFAs are considered to include the area within a .5 mile radius circle (approximately 500 acres) around the most recent known nest site. Since nest sites routinely change, often by distances greater than ¼ mile, the actual area associated with nesting and foraging can be highly fluid which makes separating the nest stands and PFA difficult at best and therefore the model makes no attempt to distinguish between the two. The model does not recognize land allocations such as GPACs therefore various amounts of the allocation are included in the model. The PFA for territory 45-3 (Figure 3-14) which is immediately adjacent to the project area would not be affected, therefore, there would be no discernable direct or indirect affects and the territory will not be discussed further. The nearest goshawk territory outside the project area, with the exception of Territory 45-3, is approximately one mile away.

Overall this alternative would have minor to moderate impacts to habitat through changes in structure with very little change in habitat suitability where habitat suitability is determined by CWHR values.. The group selections are expected to generate the most change in habitat value but account for the lowest acres that are affected. All thinning would likely reduce habitat value, either through reduction in nesting habitat suitability or through simplification of the habitat. The effects to habitat can include a decline in the amount of decadence and loss of stand heterogeneity due to concentrating on the removal of the lower size classes within the treated areas.

Treatments that affect habitat having canopy closures greater than 60% would result in a decline in suitability as nesting habitat but remain moderately useful for foraging. Those areas within the PFA treated through area thinning and DFPZ prescriptions A and C would return to current canopy cover densities within two to three decades and treatments would not provide a change in habitat suitability sufficient to preclude nesting or foraging in the future. Prescription B is estimated to acquire suitable nesting habitat attributes after three to five decades, but would continue to provide moderate foraging habitat. While Prescription B may reduce foraging habitat value, the treated areas would improve over time when compared to current conditions as canopy densities increase and in one decade may have higher foraging habitat value due to a reduction in the dense understory. Snag levels are likely to increase through natural processes within the project area and within the treatment areas that are underburned. This may increase habitat value for prey species such as woodpeckers through an increase in the number of snags and other decadence factors.

Table 3-46. Treated acres within Post Fledgling Area

PFA Territory	Total Acres Forest Service Lands	DFPZ	Area Treatments	Group Selections	Amount of PFA Affected (Acres/%)
37-1	500	35	64	6	105/21%
37-2	288	69	9	5	83/29%
37-3	500	2	7	1	10/2%
37-4	500	11	128	10	149/30%
37-7	500	15	21	16	52/10%
37-9	500	0	114	13	127/25%
37-11	409	80	0	15	95/23%

Source: Silvicultural and GIS data developed for the Creeks Forest Health Recovery Project.

Tables 3-46 through 3-47 provide an overall review of current PFA values and expected changes as a result of the project. The modeling indicates a slight improvement for most PFAs in terms of increasing the amount of early successional habitat, primarily due to the proposed group selections.

Reynolds (1992) states that the purpose of the PFA is to provide cover and sufficient prey for young goshawks to develop hunting skills and to feed themselves before dispersing to other areas. The desired condition is to have a heterogeneous stands which includes large trees and snags to support squirrels and woodpeckers, patches of mid-aged forests, small (less than 2 acre) openings. The actual and post treatment values for CWHR 3, 4, 5, and 6 include only those acres that currently have canopy cover greater than 40%. CWHR 1 is comprised of openings with little or no conifer cover (shrub patches or first year plantations). CWHR 2 is composed of young plantations with trees less than 6 inches DBH and where canopy cover is not generally calculated. The post treatment acres reported for CWHR 3, 4, 5, and 6 reflect only those acres that would retain canopy cover greater than 40% after treatment based on the prescriptions. The PFA acres in the model would include the nest stand areas (of approximately 90 acres) plus the additional area used by fledglings.

As with Table 3-46 the following tables only look at changes on federal lands as private lands cannot be depended on to maintain suitable goshawk habitat.

The model does not reflect structural changes within the treatment units that retain the same strata level. The project would reduce the amount of suitable nesting habitat within the acres treated owing to reductions in cover (below 60%) and decadence including some decline in trees with mistletoe and snags which support a high population of prey. As discussed in Reynolds (1993), these are elements that are closely tied to successful nest sites. Since the project activities do not take place within goshawk PACs, existing nest stands would not be affected. The treated stands would be less complex and would likely have reduced prey availability. However, since the project would affect less than 50% of any PFA (and none of the nest cores) the risk to the species is considered to be low and the impacts temporary. The impacts are not expected to result in territory abandonment or a reduction in nesting attempts. Nest disturbance during operations would be mitigated through limited operating periods within ¼ mile of nest sites.

Table 3-47. Changes in the Post Fledgling Area model associated with project effects

PFA CWHR Characteristics	PFA 37-1 500 Acres			PFA 37-2 288Acres			PFA 37-3 500 Acres		
	Desired	Actual	Post*	Desired	Actual	Post*	Desired	Actual	Post*
60% CWHR 4, 5, 6	300	402	424	173	180	177	300	318	317
20% CWHR 3	100	35	44	58	105	103	100	46	46
10% CWHR 2	50	47	11	29	0	0	50	0	0
10% CWHR 1	50	16	23	29	3	8	50	136	137
PFA CWHR Characteristics	**PFA 37-4 500Acres**			**PFA 37-7 500Acres**			**PFA 37-9 500 Acres**		
	Desired	Current	Post*	Desired	Actual	Post*	Desired	Actual	Post*
60% CWHR 4, 5,6	300	408	397	300	492	472	300	332	318
20% CWHR 3	100	13	13	100	8	2	100	151	151
10% CWHR 2	50	64	64	50	0	0	50	8	8
10% CWHR 1	50	15	26	50	0	26	50	9	23

PFA CWHR Characteristics	PFA 37-11 409Acres		
	Desired	Current	Post *
60% CWHR 4, 5, 6	245	395	370
20% CWHR 3	82	14	14
10% CWHR 2	41	0	0
10% CWHR 1	41	0	25

* Post Treatment

Source: District Wildlife files and silvicultural data developed for the Creeks Forest Health Recovery Project.

Goshawks are known to prefer to forage (and nest) in stands that are fairly dense but have an open understory, therefore, the area thinning treatments are likely to improve foraging habitat within the treated stands. There may be short term decreases in nesting attempts due to changes in habitat for one or more of the known territories however the impact of the project effects are likely to be masked by other factors such as weather and prey abundance.

The HFQLG Pilot Project was developed in part to test whether certain landscape treatments are effective in reducing the effects of stand replacing fires (HFQLG FEIS 1999). If successful, the treatments would reduce the impact to suitable habitat for this species. To date, there have been no large fires on which to base the effectiveness of the treatment and since fires are not predictable in space or time, there is no basis on which to compare not implementing the project.

Cumulative Effects to the Northern Goshawk

The area considered for cumulative effects to Northern goshawk is the project area. As with the analysis for the California spotted owl, there are two areas cumulative effects are considered, the impact to populations within the Lassen National Forest and cumulative effects to territories and habitat. The direct and indirect effects are not likely to generate sufficient changes that would preclude successful nesting and fledging of young over time therefore the project is not likely to affect population trends at the Forest level.

The vegetative communities have no doubt changed dramatically over the last 150 years. Historical evidence would indicate that the project area was more diverse with larger amounts of conifer communities in the larger age category. Conversely, the number of stands with canopy closures greater than 60% was probably equal or lower than current conditions. With the advent of fire suppression white fir began to dominate stands in terms of the number of trees per acre. The change in vegetative species was compounded with the advent of

timber harvest. The past vegetation management projects outlined in the list of cumulative actions (Appendix A) and detailed in Tables 3-29 and 3-30, have effectively reduced the overall forest complexity through the lowering of decadence and reducing heterogeneous stand structures. Heterogeneous factors important to goshawks are variable stand densities and basal areas, reflecting their preference for a highly diverse stand and landscape. As outlined in Table 3-30, these factors have been reduced through the individual stand treatments. Decadence is an important secondary factor as it provides habitat for a myriad of prey species and that habitat has also been reduced based on the predicted impacts outlined in Table 3-30.

Vegetation management direction over the last decade has provided canopy retention guidelines that emphasize retention of higher canopy densities. Those guidelines, in conjunction with the absence of disturbance (fire), have led to an increase in canopy densities, increasing the overall amount of nesting habitat. High quality nesting habitat however remains low due to the past practices, particularly with TFA prescriptions. It is also true that the actions that have favored increases in nesting habitat have also led to increased the understory canopies as well, conditions that do not favor this species. The direct and indirect affects provide predictions on the length of time it would take for habitat value to return to current values (allowing for canopy changes and structural improvements). This would be offset by any maintenance that maintains the habitat in the condition outlined in the proposal. While canopies may increase over time (due to increased growth) other attributes such as shrubs, snags, and young trees that provide cover for prey would be periodically removed to maintain the DFPZ, and therefore the habitat values are likely to remain at a lower value than would naturally occur.

As with this project, other thinning actions may lead to improved foraging conditions through the removal of the understory trees. The actual improvement may take several decades before a treated area develops the decadence attributes associated with quality foraging habitat. There is a measure of uncertainty associated with a prediction of effects. Projects of this nature elsewhere have resulted in temporary abandonment (where nest sites were not protected) only to be recolonized several years later. Since known nest groves are now protected and high quality nesting habitat is only lightly treated, the impacts to the goshawk at the District and Forest level are difficult to predict even though a large number of territories are likely to be affected through actions such as this.

Because of limited impact to habitat, other activities such as range management, recreation, and fuel wood gathering would have little affect on goshawks, except for an occasional disturbance to individuals.

The SNFPA (2004) considered the actions under the HFQLG program and determined that if the project met the criteria analyzed in the HFQLG FEIS and the SNFPA Supplemental FEIS (2004) then those actions would not jeopardize species viability.

Alternative 2 - No Action

Direct and Indirect Effects to the Northern Goshawk

As discussed under the effects for California spotted owl, current direction is geared towards increasing late successional habitat characteristics while addressing fuels management issues. This direction favors goshawk-nesting habitat, which is strongly associated with dense canopy and an open understory (USDA FS, 2002a). However, barring natural phenomenon such as large fires, foraging habitat would decline and the habitat values for post-fledgling family areas (PFA) would decline. Nesting habitat is not lacking (dense stands of

medium sized trees), therefore, this alternative would result in a decrease in habitat value within the PFA and the larger foraging territory.

Cumulative Effects to the Northern Goshawk

The area considered for cumulative effects to Northern goshawk is the project area. Forest management activities over the last decade have resulted in increases in the overall stand densities at the landscape level, especially when compared to previous direction. More recent treatments (particularly TFB prescriptions) have contributed little to the stand level heterogeneity that is thought to favor goshawks (Reynolds et al., 1992; Fowler, 1988). Stand densities would continue to increase favoring nesting habitat but landscape heterogeneity (particularly with respect to variable density and basal area) and open understories would continue to decline. This would act cumulatively with direction that limits entries into spotted owl and goshawk PACs, increasing the overall amount of highly dense stands.

Alternative 14

Direct and Indirect Effects to the Northern Goshawk

Table 3-48 outlines the amount of treatment within the PFAs as discussed under Alternative 1. As indicated through a comparison with Table 3-27 there is essentially no change in the acres treated within the various PFAs. The changes in acres affected (PFAs 37-1, 37-7, and 37-9) are the result of the deletion of group selections as discussed in the description of the alternative.

Table 3-48. Treated acres within Post Fledging Areas by Prescription

PFA Territory	Total Acres Forest Service Lands	DFPZ	Area Treatments	Group Selections	Amount of PFA Affected (Acres/%)
37-1	500	35	64	5	104/21%
37-2	288	69	9	5	83/29%
37-3	500	2	7	1	10/2%
37-4	500	11	128	10	149/30%
37-7	500	15	21	14	50/10%
37-9	500	0	114	10	124/25%
37-11	409	80	0	15	95/23%

Source: Almanor Ranger District GIS

Tables 3-28 through 3-30 list the changes to the PFA as a result of implementing Alternative 1. Those impacts discussed in Alternative 1 would be carried forward to this alternative as well. There would be one exception, PL37-4 where Prescription E would be applied. This change would not be represented as a change in the table as the original prescription was expected to result in retention of suitable habitat characteristics. The new prescription would retain the suitable habitat in a better condition (untreated areas throughout 10% of the stand and higher canopy).

The implementation of Prescription E outside of currently occupied habitat may provide or at least retain quality nest sites, pockets of dense conifers within a more open stand with an open understory. This has been found to be a relatively common description of nest sites on the district however it is not known if the nests are preferentially located in such habitat or if other factors of nest site selection are responsible.

In terms of the overall assessment of direct and indirect effects, Alternative 1 accurately describes the impacts of the project on this species for this alternative as well.

Cumulative Effects to the Northern Goshawk

The cumulative effects presented in Alternative 1 are also applicable to this alternative since the direct and indirect effects are very similar.

Willow Flycatcher

Affected Environment – Current Condition

On the Almanor District, the willow flycatcher is strongly associated with meadow complexes greater than 15 acres that have slow moving water and an abundance of willow and alder greater than 5 meters tall. All known sites on the District have associated beaver activity.

There is one active site within the project area, along Butt Creek, west of Ruffa Ranch. This site has been occupied each year since at least 1995. Although the site is within a range allotment (an activity often associated with habitat degradation) the allotment has been vacant since 1998. Since becoming vacant the area immediately adjacent to the site has seen a resurgence of riparian hardwoods, notably aspen.

Humbug Valley is a privately owned (PG&E) meadow complex immediately east of the project area. Willow flycatcher were reported in Humbug Valley in 2002 (unpublished District files and records) and it is expected that more territories would occur over time as habitat for the species improves due to management actions favoring riparian ecosystems.

There are no other meadows within the project area on federally managed grounds that provide suitable habitat for this species.

Environmental Effects

Alternative 1 - Proposed Action

Direct and Indirect Effects to the Willow Flycatcher

There is the potential for periodic disturbance due to the hauling associated with the project. Given that this is a main travel route and noise disturbance is not unusual, it is unlikely additional noise would adversely affect nesting flycatchers.

The project would have little impact on the species as the project limits affects to riparian habitats such as those associated with the willow flycatcher. Thinning would occur within the RHCAs as described in the summary of the Proposed Action and the Integrated Design Features. Treatments within the RHCAs adjacent to willow flycatcher territories would have a positive effect on habitat through improvement to riparian hardwood conditions. Bombay (USDA FS, 2000b) points out that this flycatcher is negatively associated with live trees presumably because of the potential for predators. Any removal of conifers would benefit the willow flycatcher, as it would limit perches for predators. Since conifers can have an adverse affect on meadows (changing hydrology, shading riparian hardwoods), the reduction of conifers along the edge or within the meadow system would be considered a positive outcome.

Cumulative Effects to the Willow Flycatcher

The area considered for cumulative effects assessment is the project area. Previous vegetation treatments (Tables 3-29 and 3-30 and Appendix A) have had an unknown impact on the species. Although there have been harvest activities along the perimeter of the currently occupied meadow complex, there has been no apparent negative impact to the species or its habitat.

Because the impacts to individuals or territories are minimal, there is no measurable affect to this species and therefore the area of cumulative effects would be the project area. The current range allotment that encompasses the occupied flycatcher site is vacant and would remain so until an analysis on the allotment is completed. There are no other meadows within the project area and within an active allotment that contain the willow structure sufficient to support willow flycatchers. Current range management direction for the allotment where suitable habitat exists would have positive cumulative affects when considered with the potential removal of conifers within the meadow complex.

Road traffic (recreation, administrative use, fuel wood gathering) would act cumulatively to increase the potential for noise disturbance. This has not appeared to be an issue in the past and the impact is likely to be minimal.

The Willow Project Area has very little habitat that could be considered suitable and no meadows that currently provide suitable habitat therefore there is no discernable cumulative effect to habitat from the two projects.

Alternative 2 - No Action

Direct and Indirect Effects to the Willow Flycatcher

Alternative 2 would have no appreciable affect on this species over current conditions. Conifers would continue to grow at the edges of the meadow that surveys as a breeding site; however, it would likely be several decades before conifers adversely affect the site.

The HFQLG Pilot Project was developed in part to test whether certain landscape treatments are effective in reducing the effects of stand replacing fires (HFQLG FEIS 1999). If successful, the treatments would reduce the impact to suitable habitat for this species. To date, there have been no large fires on which to base the effectiveness of the treatment and since fires are not predictable in space or time, there is no basis on which to compare not implementing the project.

Cumulative Effects to the Willow Flycatcher

The occupied meadow complex falls within a currently vacant range allotment. Prior to vacating the allotment, a series of successful steps were taken to maintain habitat through a series of fences. The disposition of the allotment remains unknown until the allotment is analyzed (summer 2005). Since there are limited direct and indirect effects, there are no predictable cumulative effects associated with this alternative.

Alternative 14

Direct and Indirect Effects to the Willow Flycatcher

As with Alternative 1, there is very little impact from this alternative to existing territories or habitat. The discussion of direct and indirect affects for Alternative 1 is applicable to this alternative.

Cumulative Effects to the Willow Flycatcher

The area considered for cumulative effects assessment is the project area. The discussion of cumulative effects for Alternative 1 is applicable to this alternative.

Pacific Fisher / American Marten

Affected Environment – Current Condition

Range and Status

Trapping records from the late 19th and early 20th century are the primary source for historical information on marten and fisher in California. Presumably due to furbearer population reductions, trapping records of marten and fisher declined starting around 1915. The population declines resulted in legal trapping gradually closing in most of California between 1945 and 1954 (Bryant, 1915; Zielinski and Stauffer, 1996). Grinnell et al. (1930) reported that marten had been observed throughout Lassen National Forest and that winter trapping had been responsible for a "recent reduction in numbers seen near Summit Lake". Grinnell et al. (1930) also reported sightings from Broke-off Mountain (Lassen Volcanic National Park) to Eagle Lake, and in Battle and Warner creeks on the Lassen National Forest. Fisher were reported to have been taken by trappers at Eagle Lake in the 1920s and anecdotal reports from locals suggested that fisher had been trapped in what is now the Caribou Wilderness area, west of Eagle Lake (Grinnell et al. 1930). Ingles (1947) stated that the best place to see fisher was in the Sierra region between Yosemite and Sequoia National Parks and within the Trinity Mountains, and that fisher were extremely rare elsewhere in the Sierras.

Currently, marten appear to occupy much of its historic range in California particularly in the Sierra Nevada (Kucera et al 1995). Local survey data indicates that marten are well distributed within red fir zones throughout the Lassen National Forest, particularly on the Almanor District but the population status remains unknown. With the exception of Sierra Nevada red fox around Lassen Volcanic National Park, other rare forest carnivores, such as fisher and wolverine, have not been detected within the last three decades although unconfirmed sightings are occasionally reported. The Lassen National Forest utilizes forest carnivore survey methods described by Zielinski and Kucera (1995; Zielinski, 1993) to determine the presence of forest carnivores, including marten, Sierra Nevada red fox, fisher, and wolverine. The prescribed method involves placing baited camera stations in a designated grid pattern. Cameras have been deployed during the winter months as a means to reduce equipment damage by bear. Winter surveys also seem to have the added benefit of increased detections when compared to surveys completed in the same area during the summer.

Twenty-three camera stations have been placed in various locations throughout the project area since 1996, primarily in the southwestern sections (Figure 3-15) of the project area. District records also include incidental but unverified sightings that date back to 1981. The most recent survey work within the project area was completed in 2003. All camera stations were located in CWHR 4M and 4D red and/or white fir-dominated mixed conifer stands. The continuity of these stands varied from site to site and adjoining stands had a considerable amount of variability in forest types and age classes. Of the twenty-three total camera stations within the project boundary, eleven have recorded marten. Fourteen of the twenty-three cameras were placed within the former Habitat Management Areas (HMA) which contains some of the highest quality habitat within the project area and is considered a likely corridor to access areas of late successional habitat. Six of the fourteen stations within this area have recorded marten. Surveys have been completed primarily for timber management activities; therefore, the project area has not been fully surveyed.

Although marten have been recorded fairly regularly in more open habitats such as the talus slopes around Silver Lake, in the sparse forests within and adjacent to the Caribou Wilderness, and in shrub/conifer

complexes adjacent to the project area (Scotts John Creek), the majority of marten within the project area appear to be in the red fir communities on the west side of the project area (Figure 3-15). The primary areas marten have been found is along Sawmill Tom Creek, Humbug Summit, Humboldt Summit, Milkhouse Flat, Cirby Meadow and Yellow Creek (unpublished District Records and Files). There are also several records of marten in the northern portion and southeast portion (Peacock Point) of the project area. Given the number of sightings over the years and the distribution of those sightings, it is likely that marten occur throughout the project area.

There are limits to the information that survey data provides. Surveys only offer presence data and cannot provide any estimation of population numbers, reproductive success, or territorial data. Therefore, assumptions on the status of the local population, other than to say that marten are present throughout the project boundary, cannot be made.

Fisher Habitat Description

Fisher are widely considered to have been extirpated from the northern Sierra's. The US Fish and Wildlife Service (USDI F&WS, 2004) described a gap in their distribution within California that extends from the southern Cascades above Redding, California to the southern Sierras. The closest known population of fisher (Shasta Lake area) is associated with oak woodlands, presumably due in part to decadent large oaks that provide den and rest sites as well as increased prey availability resulting from mast production (Carroll et al. 1999, Truex et al. 1998). Fisher do not appear to overlap with marten, possibly due to predation conflicts and competition for den sites and food (Freel 1991).

The criteria for fisher habitat is similar to that described for marten in terms of cover requirements ; however, the fisher's home range is considerably larger, up to 9,000 acres (Freel 1991) and fisher are generally found at elevations below that of marten. Canopy cover greater than 50% has been found to be an important habitat attribute for fisher (Olsen et al., 1999). Higher levels of canopy cover provide protection from predation, travel corridors between foraging sites, a favorable microclimate and increased prey abundance (Ruggiero et al.1994; Carrol et al. 1999; Olsen et al. 1999). Ruggiero et al. (1994) stated that fisher habitat structure might be more important than specific forest types. This preferred structure includes a variety of tree sizes and shapes (stand heterogeneity), dead and down wood, and multiple layers of cover. Dense riparian corridors may also be an important habitat feature used by both fisher and marten to travel between areas of late seral suitable habitat for resting and denning (Freel, 1991). Maintaining large continuous core areas with sufficient canopy cover, snags, and down logs for reproduction is crucial in maintaining a viable population (Buskirk, 1994)

Snow depth may be a limiting factor as well, confining fisher to the lower elevations (Freel, 1991, Raine 1983, USDA 1994). Ruggiero et al. (1994) reported that snow appeared to limit fisher distribution in Washington. Krohn, (1997) and Olsen et al. (1999) observed that fisher find it difficult to travel over or under snow as easily as marten, possibly due to larger body size. The dense canopies associated with preferred habitat structure characteristics may serve to limit snow depths as well as providing a high diversity of prey.

A review of conditions for fisher found in the southern sierras (www.fs.fed.us/r5/snfpa/am/monitoringreport2004) was completed for this analysis. While marten and fisher occasionally occupy the same areas, in general there is very little overlap of fisher sightings with those of marten. Fisher in the southern Sierra's were found to generally be below 5,800 feet. Average low temperatures

during January where fisher are most common was found to be around 27 degrees Fahrenheit and precipitation is primarily rainfall (www.weather.com). This would indicate that fisher have a preference for areas where snow does not persist. Zielinski (personal communication 2005) concurred that snow can be a factor utilized in setting parameters for fisher habitat characteristics.

There are no verified records of fisher within the project area and no verified sightings on the District within the last 20 years. The most reliable sightings are from the area within and east of the Caribou Wilderness and date back to the 1920's. This is an area that receives considerable snow in the winter but has riparian linkages to east side habitats were winter snow is limited. Snow depths, based on the literature reviewed for this document and discussions with species specialists, would seem to preclude the project area from being considered suitable habitat. The lowest elevation within the project area is approximately 5,200 feet and generally receives 4 to 6 feet of snow in December lasting well into May and upper elevations receive considerable more snow. The surrounding area also receives considerable snowfall which would make it difficult if not impossible for fisher to maintain a home range without a major migration to lower elevations. None of the literature reviewed mentioned migrating or seasonal use of higher elevation habitats where they would be outside a territory.

Although some of the vegetative attributes may be present, based on habitat preferences shown in the southern sierra's and factors such as snow, the project area provides little or no habitat potential for this species therefore the project would have little or no affect on the totality of habitat within its former range. Because individuals would not be affected and the habitat that would not be considered suitable (due to overlap with marten, snow depths, and vegetative components) the fisher is not further analyzed in this document.

Marten Habitat Description

The literature generally associates marten with climax and mature forest vegetation (USDA 1994). Marten have been found to prefer fir (*Abies* spp.) or spruce/fir (*Picea* spp./*Abies* spp.) in the western United States that have a well-developed overhead canopy (Ruggiero et al., 1994; Freel, 1991). Canopy cover and forest structure, vertical and horizontal, may be more important habitat features for marten than forest age or composition (Buskirk, 1994). Canopy cover and denser stands provides a number of the habitat needs such as concealment from avian predators, the mesic conditions and fallen trees required by marten prey, and a favorable seasonal microclimate through reduced snow depth under the canopy. Some early successional stages can also provide overhead cover in the form of dense herbaceous or shrubby vegetation (Ruggiero et al., 1994). Course woody debris, especially in the form of large diameter boles, provides many of the habitat needs that martens have for physical structure, such as access points into subnivean spaces.

Sierran marten have been documented in various habitats including riparian corridors comprised of lodgepole pine stringers, meadow edges, shrub fields, and rocky outcrops. Despite the wide range of habitats in which they are found, marten are primarily associated with mixed conifer and red fir forest types at elevations above 5,000 ft. Although marten have been found in a variety of forest communities, they consistently demonstrate a preference for 60% to 100% canopy in a multi-storied forest type (Freel, 1991, USDA Forest Service 1993a Appendix O-13). Literature reviews by Thompson and Harestad (1994) and Takats et al. (1999) cite data which indicates marten avoided forests with less than 30% canopy cover and prefer a canopy of 50% to 75%. Forest structural components such as downed logs and large snags are habitat

attributes that are essential for natal and denning sites, providing cover for predator avoidance, and providing prey habitats (Thompson and Harestad, 1994; Buskirk, 1994; Takats et al., 1999, USDA 1994).

Freel (1991) developed a model (Table 3-49) for marten in California after reviewing applicable literature and the model is similar to that presented in the 1993 LNF LRMP, Appendix O. Freel (1991) states that home range size is directly related to the amount of suitable habitat within the landscape. Presumably changes in the amount and quality of habitat could affect the size of the home range. The SNFPA FSEIS (USDA 2004a) states that marten habitat consists of CWHR classes 4M, 4D, 5M, 5D, and 6, with classes 5M, 5D, and 6 consisting of the highest quality habitats that support reproduction, which concurs with Freel (1991). Based on Table 3-49, the project area currently provides moderate habitat value overall. As noted in the discussion on stand structure many species prefer stand heterogeneity. Based on the model marten are no exceptions. Even for high quality habitat, areas with canopy cover below 40% are considered desirable as long as there is a larger tree component and openings that take up no more than 20% of the stand and retain a large tree component. This may be mimicked in some of the group selections.

Table 3-49. Forest carnivore habitat assessment model.

Habitat Parameter	High Habitat Value	Moderate Habitat Value
Home Range	1400 Acres	2100 Acres
Denning/Resting	CWHR 5/6	CWHR 5/6
Foraging	CWHR 4, 5, 6	CWHR 4, 5, 6
Minimum Stand Size	>120 Acres Mature Stands	80 – 119 Acre Mature Stands
	>500 Acres in open Canopy Areas	200-499 acres In open canopy
Denning/Resting Canopy Closure	>70% CWHR D	41-70% CWHR M, D
Stand Structure	50% Mature (>CWHR 5D)	35% Mature (>CWHR 5D)
	30% >CWHR 5M	45% CWHR 5M
	20% CWHR 5S/5P/other	20% CWHR 5S/5P/other
Basal Area	> 350 Sq FT	176 – 350 Sq Ft
Riparian/Wet Meadows – Proximity to Closed Stands	< ¼ Mile	¼ - ½ Mile
Openings	<1 Ac each	1 – 2 Ac each
Snag Densities		
Rest/Denning	> 3/Acre 24"+ dbh	2 – 3/Acre 24"+ dbh
Paved Road Densities	<1Mile/Sq Mi.	1 – 2 Miles/Sq Mi.
Travel Corridor		
Canopy Closure	>60%	50% - 60%
Width	>300 ft within mature stands	150 – 300 ft. within mature stands
	>600 ft adjacent to open/no canopy	300-599 ft when adjacent to open/no canopy
Habitat Spacing	< 2 miles	>2 – 3 miles

Source: Freel (1991) pg 6

Marten typically utilize two types of dens, natal and postnatal. Natal dens typically are found in natural cavities in large trees, snags, stumps, logs, burrows, caves, rocks, or crevices in rocky areas. The dens are lined with vegetation and occur in structurally complex, late successional forests (Ruggiero et al., 1994). Post-natal dens are typically found in cavities, logs, underground, or in slash piles (Bull and Heater 2000). Canopy cover and the number of large old trees in these patches exceed levels available in the surrounding suitable habitat.

The availability of habitat suitable for natal dens may limit reproductive success and population recruitment; which has direct repercussions on future population size (Ruggiero et al., 1994).

The existing condition for marten habitat within the Creeks Project boundary is summarized in Table 3-50. Private lands are not considered due to the uncertainty of sustaining current suitable habitat conditions. CWHR values were used to calculate existing stand conditions. Current literature suggests that canopy cover and structure are limiting factors and that the vegetative species composition is of less importance (Spencer et al. 1983, Buskirk 1994, Freel 1991, Thompson and Harestad 1994) therefore, canopy cover, stand density, and the average tree diameter was used to determine habitat suitability while forest type was not considered. Other attributes that may be important including the amount and distribution of logs and the potential for down wood recruitment is not included in the CWHR modeling and is considered separately. Moderate to high quality suitable habitat (Table 3-50) within the Creeks boundary makes up approximately 59% of the total land base with less than 1% of that represented by 5D and only 5% as 5M. The majority of the suitable habitat within the project boundary is 4M, approximately 34% of the total federal land base within the project area. Analysis determined that approximately 5% of the total land base is represented by openings and approximately 71% of the existing openings are associated with previous vegetation management projects.

The prey base for marten is highly variable but voles (*Microtus* spp and *Clethrionomys* spp) have been found to be a major dietary component throughout the martens range (USDA FS, 1999b, Zielinski et al. 1983). Other prey within California includes tree squirrels, chipmunks, mice, shrews, rabbits and pikas (Zeiner et al 1990b). Habitat associations for prey are highly variable. Voles are primarily found in wet meadows, perennial grasslands, and herbaceous understory. Chickarees (Douglas squirrels) are locally common and likely provide a staple prey item. While microtine rodents such as voles and mice are more commonly associated with shrub or more open coniferous stands, Douglas squirrels are more closely associated with intermediate to mature conifer habitats that have a tree/shrub ecotone. Deer mice (*Peromyscus* spp) are found in virtually all habitats (Zeiner et al. 1990b).

Table 3-50. Marten habitat comparison- pre and post-treatment

CWHR	Existing Acres	% Land Base	Acres Post Treatment	% Land Base Post Treatment
Moderate to High Quality Habitat				
5D	172	<1	171	<1
5M	1459	5	1733	6
4D	5023	17	4125	14
4M	11039	37	9005	30
Total	17693	59%	15034	50%
Marginal Habitat				
5P	439	1	434	1
4P	4591	15	6341	21
Total	5030	16%	6775	22%
Riparian				
Meadow	286	<1	286	<1
Riparian	213	<1	213	<1
Total	499	2%	499	2%
Openings				
Bare Ground	248	<1	248	<1

CWHR	Existing Acres	% Land Base	Acres Post Treatment	% Land Base Post Treatment
Regeneration Openings	1012	3	2257	9
Brush	175	<1	175	<1
Total	1435	5%	2680	9%

Source: Past, Present and Reasonably Foreseeable Future Actions – List of Cumulative Actions (Appendix A), GIS vegetation data, and aerial photography.

Environmental Effects

Alternative 1 - Proposed Action

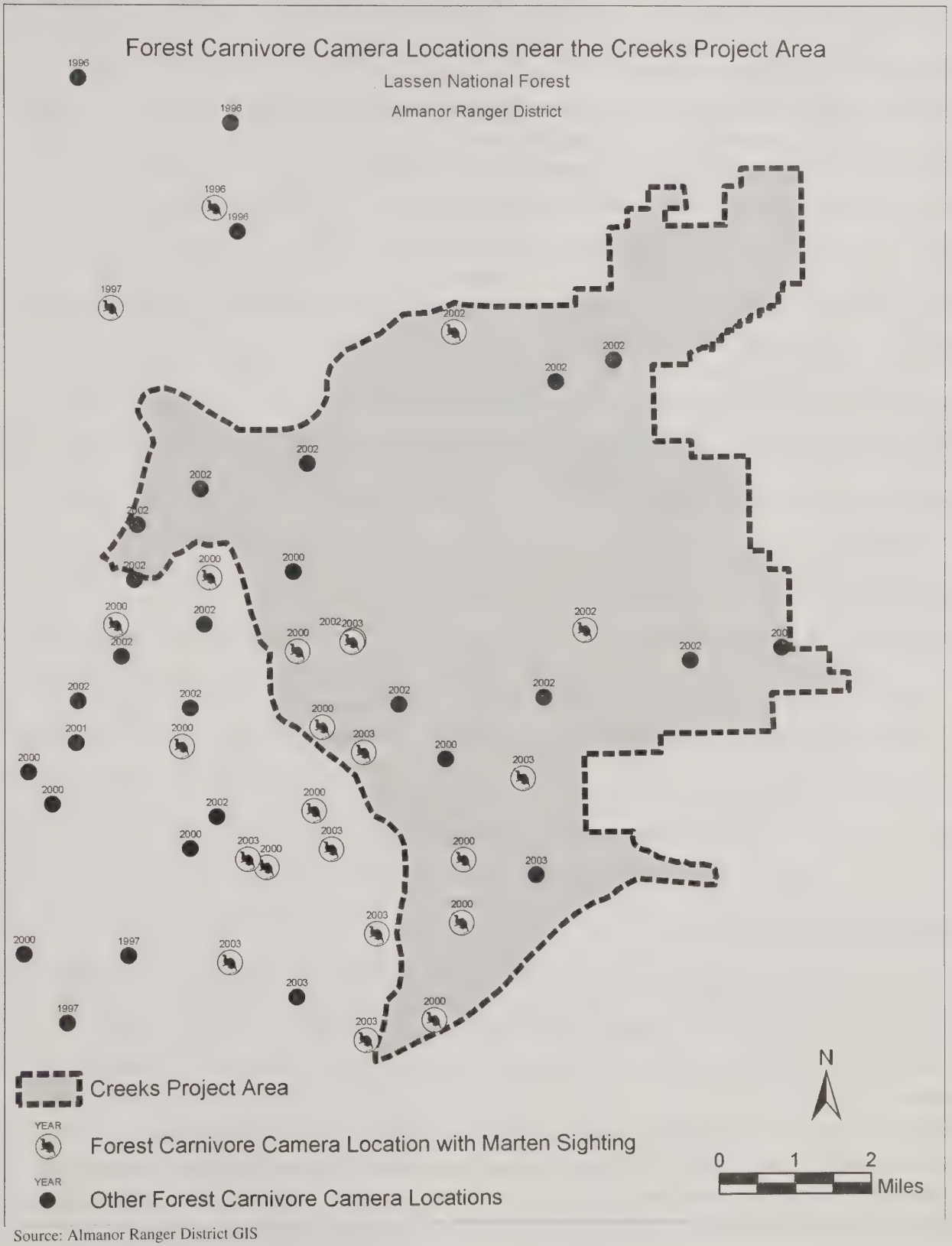
Direct and Indirect Effects to the American Marten

The difficulty in presenting an analysis of effects for this species is compounded by several factors. First, there is little behavioral data on marten within this portion of their range (Guldin and Stein 2003). Additionally, while a number of articles examine the implication of clearcutting or overstory removal (Potvin et al 2000, Payer and Harrison 2003) there is a paucity of literature that examines the effects of thinning, utilizing the prescriptions in the proposed action (Self and Kerns 2001). As was mentioned earlier, anecdotal and historical information would indicate that marten on the Lassen utilize a wide range of habitats, including rock bluffs and more open habitats, therefore the affects of habitat changes such as thinnings are difficult to predict. While all legitimate data of habitat use needs to be considered, conclusions cannot be drawn on anecdotal information that relies on small sample sizes (USDA 1994). There is also a lack of data on marten habitat attributes and individualistic behavior where they occur outside of dense conifer stands. Secondly, although marten have been found throughout the project area, a general lack of population data makes it impossible to determine an approximate number and size of home ranges, whether home ranges overlap, or if there have been changes in populations over time.

Because of these uncertainties with local population data, the analysis of habitat and the subsequent impacts of this project are derived from existing models and literature where site-specific data is lacking. The most limiting habitat component is a lack of high quality den and resting habitat (CWHR 5M and 5D) sufficient to assure reproductive needs are met within the project area. The project area lacks large blocks (>120 acres) of denning/resting habitat that would support den site disbursal across the landscape. This project would have little effect on existing denning habitat. Although limited amounts of high quality habitat may be treated, canopy cover would remain sufficient to provide the cover needed by this species although the quality of that habitat would decline. Generally the larger logs that would be used as den sites are left intact as they provide valuable wildlife habitat without compromising the intent of fuels reduction objectives.

There are few predictable direct effects to individuals that would occur due to the proposed activities. There is a very low risk to either natal or post-natal den sites, as the project would affect very little of the habitat that likely to contain dens. There is a slight risk to direct impact to individuals during operations beyond disturbance due to project noise. Given the limited area of operations at any given point in time, marten would have the option to move to undisturbed habitat. Disturbance to occupied denning sites is unlikely due to the seasonal restrictions to operations due to snow depths that generally preclude operations December through May. By this time, marten would likely have abandoned the dens for the season.

Figure 3-15. Forest Carnivore Camera Locations near the Creeks Project Area



Source: Almanor Ranger District GIS

The project would have three primary indirect effects; reduction of the value of suitable habitat within treated areas, reduction of habitat value within areas serving as travel corridors (connectivity), and an increase in the overall fragmentation of suitable den and resting habitat by decreasing canopy cover below minimal needs between areas of suitable habitat.

The proposed treatment areas affect approximately 40% to 45% of the areas most used by marten within the project area based on survey results and habitat preference. The treatment would reduce the utility of the treated area in a manner that may affect the number and size of the territories or home ranges supported within the project area. Assuming the current condition supports a mixture of habitat with moderate to high habitat value within any given home range, thinning would reduce the habitat values due to the associated canopy loss and slight potential decrease in snags and down wood material that is an essential component of subnivean (under snow) foraging. While the area treatments are expected to result in stands that have greater than 40% canopy they would not approach the preferred 60% canopy cover for one to three decades.

Prescription B would generally not retain sufficient cover to be considered suitable denning and resting habitat but would retain sufficient cover (greater than 30%) to allow movement through the area (Thompson and Harestad, 1994, Takats et al. 1999). However stands that are more open (30% to 50% canopy cover) would conversely increase suitability for predators, such as fox, coyote, bobcat, and raptors. It follows that the more open habitat that marten utilize (for foraging or as a connective route to other habitats) the greater the risk of predation.

As illustrated in Figure 3-16, there are two areas within the project boundary where treatments could have a measurable affect on habitat connectivity.

- The Northern sections, T27N, R5E sec 14, 23 and R6E sec 17, 18, 19, 20 of the project area contains approximately 850 contiguous acres of CWHR 5 stands. DFPZ Prescription B bounds these areas to the south, north, and east. The treated areas are part of a previous thinning and currently the DFPZ is only marginally suitable as a travel corridor. Further treatment would further reduce the connectivity to areas outside the block of high quality habitat. Groups would also tend to add an element of fragmentation to the remaining suitable habitat that could serve as forage or as a travel corridor. The only camera station that was located in this area confirmed marten presence. A large portion of the moderate to high quality habitat that provides the current connectivity would be reduced to low quality habitat. Specifically, this would result in a linear strip (DFPZ) being placed between an area of moderate to high quality habitat and the remainder of the project area.
- Despite the effects of the Storrie Fire and later salvage sales on federal and private lands the southern-most extent (T26N, R6E sec 27, 28, and 34) provides connectivity from moderate to high quality habitat adjacent to the project boundary. Prescription B DFPZ would create a strip of low quality habitat (marginally suitable) between this area of quality habitat to the south of the project area and habitats to the north.

Group selections can increase landscape heterogeneity and increase the foraging habitat potential of an area where these habitats are lacking. However, when concentrated within suitable habitat the benefits of adding heterogeneity may be outweighed by the negative impacts of the potential for creating barriers between areas of suitable habitat (fragmentation of habitat). Determining what percentage of the landscape could be altered by groups before marten are adversely affected is difficult at best. Potvin et al. (2000) suggested that up to

30% of the land base could be taken up by clearcuts before home range viability is threatened. However, Potvin's study was conducted in a homogenous boreal forest system with little natural fragmentation. A study also conducted in Canada by Takats et al. (1999), suggested marten use may be limited in landscapes with greater than 25% of the land base in openings created through natural or anthropogenic means. By contrast, Sierran forests contain a great amount of natural heterogeneity caused by geologic, topographic, and vegetative variability (North et al In Press), therefore, marten within the Sierra's have adapted to a quite different ecosystems and it is unknown what applicability the Potvin and Takats' et al. studies may have with local populations. The lack of a site-specific threshold provides a level of uncertainty in determining the effects of creating additional openings on the landscape. The Proposed Action would almost double the amount of land base that lacks sufficient cover for marten, increasing openings from 5% to 9% (Table 3-50) of the landscape. These calculations do not include land that would be claimed by additional skid trails and landings but this is not expected to be sufficient to change the current estimates in measurable or meaningful amounts. Given that the Proposed Action would maintain the number and distribution of openings well below those cited by Potvin et al. (2000) and Takats et al. (1999), and at a much smaller size than the clearcuts cited in those studies, and given the project area is within a bioregion known for broad landscape heterogeneity, the additional openings would not appear to be an issue.

Current direction requires an analysis of project effects on the loss of connectivity (1999 HFQLG FEIS and ROD, 2004 SNFPA ROD). Connectivity can be provided through a number of habitats. Riparian areas often serve as connective corridors between habitats due to their naturally dense cover and high downed wood component. Since riparian areas are subject to specific guidelines and buffers that protect these attributes, there would be little or no affect from the project. Within the project area, riparian habitats generally run east-west, reducing quality connecting north to south habitat to the existing riparian linkages.

With the limited north-south riparian linkages, north to south connectivity would need to be provided through blocks of suitable habitat, medium to large conifers with at least 30% canopy cover. The loss of connectivity was identified as an issue early on in project development. To address the concern, RHCA prescriptions for fish-bearing streams would be applied to specific streams in the southern end of the project where the DFPZ intersects the streams. This would provide connectivity to the higher red fir zones on the west side of the project area, an important linkage to higher quality habitat to the north.

Blocks of higher quality, dense habitat such as the goshawk and owl PACs could serve to mitigate any connectivity issues in some areas. However goshawks and owls tend to prefer mixed conifer communities that are at elevations lower than preferred by marten. Based on habitat preferences PAC locations are not likely to coincide with the red fir communities that are most likely to support the highest number of martens within the project area. The utilization of PACs by marten is unknown and may be limited.

There is little late successional habitat (5M and 5D) within the project area (Table 3-2) and the two largest contiguous blocks of high quality habitat (discussed earlier) are approximately seven miles apart, one of which lies outside and south of the project area adjacent to Soda Creek. Given the distance between these aggregates the importance of any direct connectivity between these areas is unknown. The two areas would not be within the same home range, nor is it likely one would serve as a juvenile disbursal area for the other. While the habitats may be individually important, there is no discernable relationship between the two areas in terms of marten usage.

Fifty-one percent of the total DFPZ acres are currently typed as suitable habitat. After treatment, 21% would retain moderate habitat value within DFPZs with the remainder considered to be of low value. Of the 1,245 acres of proposed group selections, approximately 72% are currently typed as suitable habitat (Table 3-53). Within the treatment areas (DFPZ, Area Treatments, and group selections), high quality suitable habitat (defined as CWHR 4D, 5M, and 5D Table 3-50) would be reduced from 6,654 acres to 6,029 acres (10%) post treatment.. Across the entire project area, moderate to high quality suitable habitat would be reduced 15% post-treatment from 17,693 acres to 15,034 acres. Fifty-nine percent of the total land base is composed of stands that are moderate to high quality habitat. Project implementation would result in a reduction of moderate to high quality habitat to 50% of the available land base within the project area (Table 3-50). These data were considered across the project area and it is likely that the project would affect an unknown number of home ranges, and while cumulatively there is a net loss of suitable habitat, it appears that sufficient habitat would be retained across the landscape to allow any existing home ranges to remain viable based on the current understanding of species habitat needs.

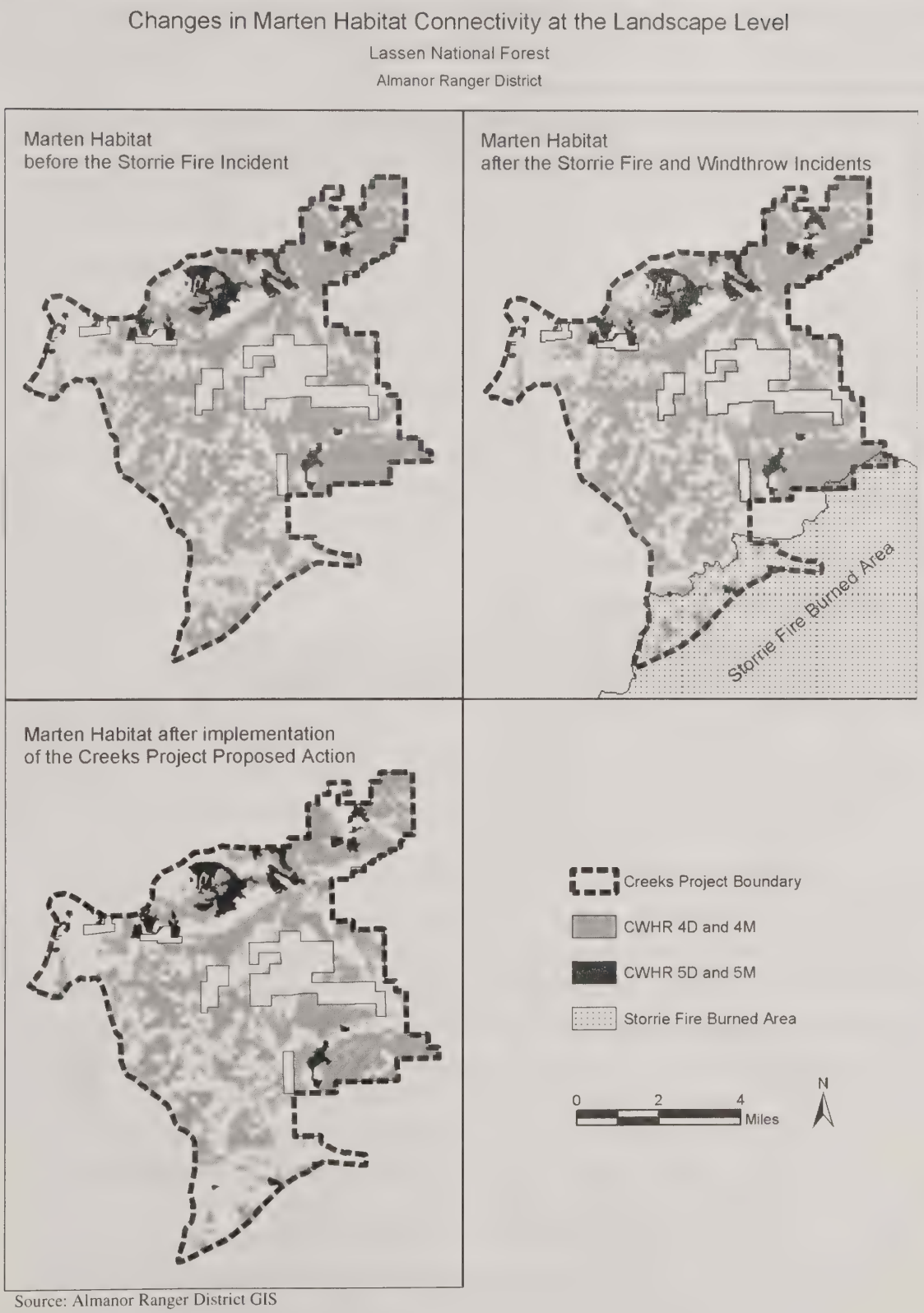
Table 3-51. Marten habitat suitability within DFPZs

CWHR	Existing Acres	% Suitable Habitat in Treatment Type	Acres Post Treatment	% Post Treatment
Moderate to High Quality Habitat				
4M	2,234	38	786	13
4D	384	7	0	0
5M	407	7	483	8
5D	0	0	0	0
6	0	0	0	0
Total	3,025	51%	1,269	21%
Low Quality Habitat				
5P	38	1	38	<1
4P	1,213	20	3,161	54
Total	1,251	21%	3,199	54%

Source: Silvicultural Data and GIS information.

As indicated in Table 3-49 models assume a larger home range is necessary as habitat values decline. Since there would be a 9% decrease in the amount of suitable habitat within the project area, there is a possibility that some home ranges may be adversely affected. Hence, the potential exists that the local population numbers or the number of home ranges may decrease as home range sizes increase in response to treatment. The affect to individuals would be minimal for each potential home range based on the expect change to the suitable habitat. The amount of overlap that may occur between home ranges is also unknown but likely occurs. Since the effect to individual home ranges is limited, it is likely the overlap between home ranges might increase in size without affecting individual numbers.

Figure 3-16. Changes in Marten Habitat Connectivity at the Landscape Level



Source: Almanor Ranger District GIS

Areas that serve as conduits to late successional habitats would decline in value but remain suitable based on current definitions. While reducing canopy cover below 40% may not dissuade marten use, the action does increase the risk of predation and is likely to impact foraging behavior and use of the treated areas.

Table 3-52. Marten habitat suitability within area treatments

CWHR	Existing Acres	% Suitable Habitat in Treatment Type	Acres Post Treatment	% Post Treatment
Moderate to High Quality Habitat				
4M	1,567	48	1,680	51
4D	347	11	0	0
5M	10	<1	237	7
5D	0	0	0	0
6	0	0	0	0
Total	1,924	59%	1,917	58%
Low Quality Habitat				
5P	22	<1	22	<1
4P	557	17	621	19
Total	579	18	643	20

Source: Silvicultural Data and GIS information.

Table 3-53. Marten habitat suitability within group selections

CWHR	Existing Acres	% Suitable Habitat in Treatment Type	Acres Post Treatment	% Post Treatment
4M	696	56	0	0
4D	167	13	0	0
5M	29	2	0	0
5D	1	1	0	0
6	0	0	0	0
Total	893	72%	0	0%

Source: Silvicultural Data and GIS information.

Affects to Prey Base

Predicting the impacts to common prey for marten is also difficult due to the wide variety of habitats that these species occupy. The CWHR program (California Department of Fish and Game, Version 8) was reviewed to determine habitat preferences for three common prey species, the montane vole, the Douglas squirrel, and the deer mouse. Habitat suitability models (HSI) for voles indicate a high affinity for meadow/shrub complexes and in general a low affinity for conifer stands greater in size than CWHR 2. Herbaceous layers are essential for the vole for both feeding and cover. Although not essential, grass and water edge elements are preferred. In contrast, the HSI models for Douglas squirrel indicate that, within red fir and mixed conifer stands, high quality habitat is associated with denser stands that contain large-sized slash preferred for cover and feeding. Both trees and shrubs are preferred for reproduction, cover, and feeding. Once the conifers achieve approximately 11 inches dbh, the size of the trees appear to have little importance according to the model, rather the amount of cover appears to be the limiting factor. Within red fir and mixed conifer, stands with greater than 40% canopy provide medium to high quality habitat for Douglas squirrel.

Deer mice prefer moderate to open coniferous stands in both red fir and mixed conifer regimes, based on the HSI models. The highest habitat value is found in the younger (CWHR 2) stands. Larger sized slash (logs and woody debris) is a preferred habitat attribute for reproduction, cover, and feeding. The model indicates that shrub or grass cover is also preferred for cover and feeding.

Overall, the project would have minimal affect on prey species. Habitat values would be lowered for deer mice and Douglas squirrels within the treated areas, however since the project would affect a small part of the overall amount of habitat, the risk to these species, particularly the voles, is low since habitat conditions are moderate to high elsewhere in the project area.

Summary of Effects

The project is likely to have three main indirect impacts to marten within the project area; a reduction in the quality of habitat within the individual home ranges, increased potential for mortality due to predation, and a reduction in the quality of connective habitat for project area ingress and egress. The DFPZs and area thins would result in a reduction in the quality of currently suitable habitat through a reduction of cover and loss of complex physical structure especially near the ground (USDA 1994). The reductions in the amount of ground structure (logs, shrubs, thickets of smaller trees) make the untreated areas such as riparian stringers, especially important. Even with the reductions the project area would retain moderate habitat values overall.

The loss of the complex structure increases the risk of predation. Bull and Heater (2001) reported a 40% - 50% mortality rate, primarily from predators such bobcat, raptors, and other marten. Opening up stands and reducing near-ground hiding attributes especially in linear strips as would occur with Prescription B is likely to increase the potential for more mortality than might currently exist. Conflict may occur where quality habitat becomes limited (such as stream courses that remain untreated or receive only limited treatment), reducing the ability for marten to avoid each other, increasing the potential for conflict. The use of stands by marten that have been treated with these prescriptions (Prescription B) remains largely unexplored. The area thins are not likely to pose the same level of risk that Prescription B would as more near ground complexity and overhead canopy would remain.

The impacts from the reduction in the quality of connectivity is interwoven into the two previous issues but also factors into the ability for marten to move throughout the project area, especially young disbursing. The east-west alignment of the treatments (both DFPZ and area treatments) does not preclude north-south movement by marten but may concentrate movement in the untreated areas, resulting in the conflicts described earlier. The DFPZs also increase the amount of low quality habitat that serves to connect the higher quality habitat south of the project area (Chipps and Soda Creek areas) to the red fir belt on the west side of the project area. Connectivity in the southern portion of the project area was addressed through assigning protective measures to several key areas (stream courses).

The direct and indirect effects are expected to reduce the overall habitat suitability, provide a low to moderate risk of population declines due to increased predation, and reduce the overall quality and amount of habitat that provides connectivity in the project area. There is a certain level of uncertainty concerning the project effects and risk to species as there is a limited amount of study on the effects of thinning utilizing the prescriptions outlined in the proposed action.

The effects of temporary and permanent road construction and road decommissioning activities were considered in the analysis as well. The areas being considered for these activities are generally not within areas

known to have the largest concentration of marten therefore the impacts are limited. The roads would not completely bisect areas of moderate to high quality habitat therefore they would not fragment habitat or limit connectivity.

Cumulative Effects to the American Marten

For all alternatives, the area of consideration for cumulative effects for this species includes the Grizzly and Yellow Creek watersheds within the Storrie Fire area outside the project boundary, the national forest system lands that border the project area to the north and the Willow Project Area to the west. This area is shown in figure A-8 (Appendix A).

The overall risk to marten is considered to be moderate based primarily on the reduction of habitat value within the project area, which is likely to result in a minor decline in the local population. Another concern is the reduction in habitat value for connectivity to habitats within marten territories. Again, while the habitat would remain "suitable" based on the current knowledge of habitat requirements, the thinning increases the risk of predation and reduces the amount of foraging habitat available within the Creeks project area. The cumulative effects considers project impacts in conjunction with the past activities and looks at the effects to the ability of marten to disburse beyond the project area including areas of moderate to high quality habitat to the south, north, and west of the project area. Areas to the east are primarily in private ownership and therefore cumulative impacts due to future activities cannot be accurately predicted.

Ecological data would indicate that the area was dominated by dense (greater than 60% canopy cover) on the west side of the project area and more open mixed conifer/pine communities on the east side. Large shrub areas were also likely to have been present where stand replacing fires had occurred. This changed with the advent of fire suppression in the early 1900s and timber management activities beginning in the 1950s. Sixteen different timber sales have taken place within the Creeks project area since the 1980s, which contribute to a cumulative decline in connected habitat including areas of highly suitable habitat (CWHR 5M and 5D) across the project area (Appendix A, Tables 3-29 and 3-30). The result has been younger aged stands that have high basal areas due to the influx of white fir. The large shrub complexes and prey populations that are associated with early successional habitats have generally been reduced due to fire suppression as well as objectives to increase the conifer land base. Three heterogeneity factors are considered when assessing the cumulative effects provided by past activities, multiple canopy layers, ground vegetation, and decadence, primarily large wood material. The assessment in Table 3-30 indicates that all vegetation treatments have had some level of impact to those attributes considered most important to forest carnivores. Both ground vegetation and decadence provide not only habitat for prey but are also extremely important to subnivean travel during the winter. Thinnings not only reduce the amount of vegetation and down wood during project implementation but also reduce the amount of recruitment material. TFB prescriptions have been noted to increase the amount of large down wood immediately after treatment however the extent of the increase is not known and likely differed according to the sale and follow up treatments.

The project area borders the Plumas National Forest and may have served to provide linkages from the Plumas to the Lassen. Linkages to the Plumas National Forest were affected by the Storrie fire (Figure 3-16) which burned a substantial amount of late successional habitat bordering the two national forests and contributed to a cumulative loss of habitat within the Creeks Project boundary, as much of the burned area was suitable habitat. Some habitat suitability was retained in areas with low intensity burns. Additional affects that

reduced habitat suitability occurred due to post fire salvage sales. This project would act cumulatively with this project to further reduce the connectivity between the two forests although connectivity would remain and over time improve as conifer and shrub cover is restored through natural processes.

The Grizzly and Yellow Creek drainages were severely affected by the Storrie Fire and the fire salvage and restoration activities that took place shortly after the fire, particularly on private grounds. Many of the riparian linkages were logged especially on private lands and in many cases cover has been substantially reduce. A field review for this project determined that the Grizzly Creek drainage within the project area and on Forest Service Lands immediately outside the project area was only sporadically affected and remains sufficient to provide good connectivity. Private lands that sit between the Plumas and Lassen national forests are not likely to provide connectivity for several decades as the application of herbicide and pre-commercial release of conifers would continue to retain these lands in a condition unsuitable for marten. The most useful linkages between the two forests would continue to be on federal lands.

The Willow project would occur to the west of the project area and many of the same issues noted here would apply to that project as well. The Willow Project has the potential to provide further limitations on the overall connectivity to other areas due to reductions in cover within the DFPZs. Marten have been detected in several areas within the proposed Willow project therefore it would be expected that similar project designs would be in place providing some minimal connectivity to high quality habitat through protection of RHCAs. One of the main impacts identified in the project in addition to habitat loss is the alignment of the DFPZs in a manner that bisects areas that may serve to connect areas of suitable habitat. That impact cannot be fully considered as a cumulative affect until the Willow project is better defined.

DFPZ maintenance is scheduled on a 10-year interval and would likely maintain stands in conditions similar to those resulting from the Proposed Action. These stands would be considered only marginally suitable for foraging and do not retain attributes necessary for reproductive (den) sites. This would continue to limit the connectivity between the project area and the remainder of the Forest as well as the potential for disbursal to the east and south (Plumas National Forest). Foraging and hiding habitat would continue to be limited if the small and medium woody debris as well as small trees and shrubs are removed during the periodic maintenance. While canopy cover may increase, habitat value would continue to be limited due to the lack of near ground structure.

The SNFPA (2004) considered the actions under the HFQLG program and determined that if the project met the criteria analyzed in the HFQLG FEIS and the SNFPA Supplemental FEIS (2004) then those actions would not jeopardize species viability.

Alternative 2 - No Action

Direct and Indirect Effects to the American Marten

The current conditions described earlier provide a setting to estimate the habitat value for the area, particularly the area most affected by the Storrie Fire. Connectivity remains although is generally marginal in the southern portion of the project area. Over time forested habitat conditions for forest carnivores would generally improve for forest carnivores under this alternative. Canopy cover would continue to increase along with other habitat attributes such as snags and down logs. However, conditions that support multi-layered stands would decline and eventually stand conditions (dense, even aged stands) are likely to decline in cover due to mortality associated with insect damage, drought, or a combination of factors.

Connectivity will eventually be restored in areas it was lost due to past timber management projects and wildland fires. This alternative may cause a further decline in riparian hardwoods overtime due to conifer encroachment and competition for resources, which may lead to a decline in valuable riparian corridors used by marten. However, hardwood enhancement is not addressed in Alternative 1 either.

Overall this alternative would have a positive indirect effect to marten habitat throughout the project area. It would allow for the restoration of connectivity overtime and further enhance key habitat attributes. There would be no direct effects to marten with this alternative.

The HFQLG Pilot Project was developed in part to test whether certain landscape treatments are effective in reducing the effects of stand replacing fires (HFQLG FEIS 1999). If successful, the treatments would reduce the impact to suitable habitat for this species. To date, there have been no large fires on which to base the effectiveness of the treatment and since fires are not predictable in space or time, there is no basis on which to compare not implementing the project.

Cumulative Effects to the American Marten

This alternative would combine with current direction to increase the amount of late successional habitat (2004 SNFPA FSEIS pg 31). This management strategy would result in an increase in habitat throughout the project area providing greater habitat attributes for forest carnivores. Over time there is a risk of loosing valuable riparian corridors if conifer encroachment is not treated in the riparian hardwood stands. Overall the impact to marten habitat would be positive as the landscape is allowed to move toward a late successional habitat.

Alternative 14

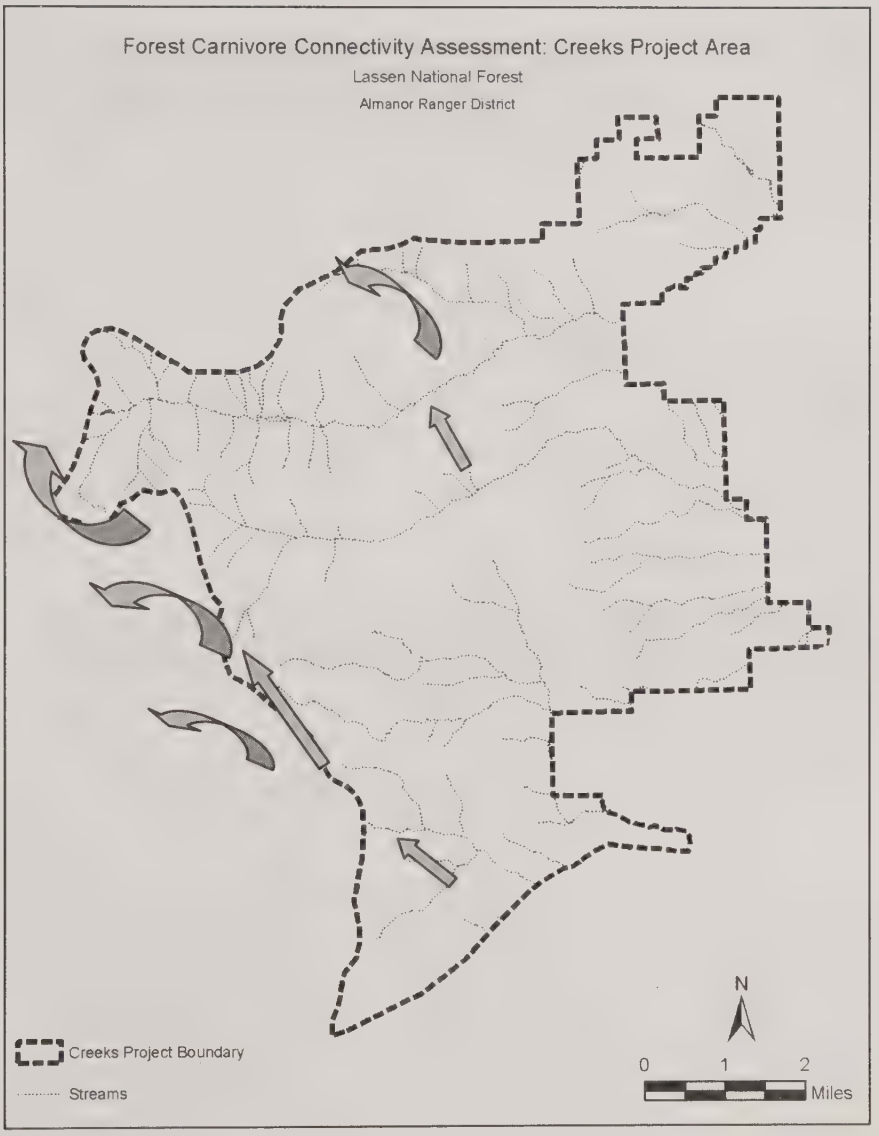
Direct and Indirect Effects to the American Marten

This alternative addresses one of the issues identified in Alternative 1, a reduction in the quality of habitat within key areas that provide connectivity into and out of the project area. A review of the changes in habitat (Tables 3-54, 3-55 and 3-56) demonstrates that over the project area, habitat changes due to this alternative would not be substantially different than this alternative. Since this alternative is very similar to Alternative 1 in terms of the effects to habitat within the project area, the effects discussion concerning individuals and populations within the project area would be applicable to this alternative as well.

Alternative 1 assessed the impacts to connectivity primarily between the area of the Storrie Fire in the southern portion of the project area through implementing specific direction for RHCAs for fish-bearing streams along two drainages on LT Creek and Sawmill Tom Creek. The design feature stipulated that the RHCAs in the two locations would extend the inner zone protection to the full extent of the 300 foot RHCA.

A new prescription was developed to better address the connectivity needs for marten, particularly for north-south connectivity which was realized to be problematic within Alternative 1. Prescription E combines a higher retention of canopy (40% - 45% minimum) with untreated areas within 10% of the stand and a higher retention of down logs (>12 inch small end diameter) to improve conditions for subnivean foraging and provide sufficient cover. These prescriptions were placed strategically to link the areas of highest habitat quality. This included areas within the former habitat management area, linking areas to the south (Storrie Fire area) to the higher quality red fir and linkages from the Butt Creek drainage north to the higher quality habitat identified in Alternative 1. This alternative also maintains existing linkages to the north and west within the former HMA. Figure 3-17 provides a review of potential connectivity routes addressed in this alternative.

FIGURE 3-17. Forest Carnivore Connectivity Assessment



Tables 3-54, 3-55, and 3-56 quantify the overall changes to habitat as a result of implementing this alternative and can be used to compare and contrast the differences between this alternative and Alternative 1 by treatment type. This alternative retains slightly more (3%) high quality habitat than Alternative 1 within the DFPZ treatment areas (Table 3-54) and treats slightly less (1%) moderate and high quality habitat under the group selection prescription. This alternative makes no changes in the amount of area thinning from Alternative 1.

Table 3-54. Changes to Marten Habitat: DFPZ

CWHR	Existing Acres	% Suitable Habitat in Treatment Type	Acres Post Treatment	% Post Treatment
Moderate to High Quality Habitat				
4M	2,234	38	968	16
4D	384	7	0	0
5M	407	7	483	8
5D	0	0	0	0
6	0	0	0	0
Total	3,025	52%	1,541	24%
Low Quality Habitat				
5P	38	1	38	<1
4P	1,213	20	2969	50
Total	1,251	21%	3007	51%

Source: Silvicultural Data and GIS information.

Table 3-55. Changes to Marten Habitat: Area Thinning

CWHR	Existing Acres	% Suitable Habitat in Treatment Type	Acres Post Treatment	% Post Treatment
Moderate to High Quality Habitat				
4M	1,567	48	1,680	51
4D	347	11	0	0
5M	10	<1	237	7
5D	0	0	0	0
6	0	0	0	0
Total	1,924	59%	1,917	58%
Low Quality Habitat				
5P	22	<1	22	<1
4P	557	17	621	19
Total	579	18	643	20

Source: Silvicultural Data and GIS information.

Table 3-56. Changes to Marten Habitat: Group Selections

CWHR	Existing Acres	% Suitable Habitat in Treatment Type	Acres Post Treatment	% Post Treatment
4M	646	56	0	0
4D	165	13	0	0
5M	26	2	0	0
Total	893	71%	0	0%

Source: Silvicultural Data and GIS information.

As outlined in Tables 3-54, 3-55, and 3-56, the differences between this alternative and Alternative 1 are subtle. The impacts, therefore, would be very similar with the exception of impacts to connectivity. Within DFPZ areas treated with Prescription E, habitat suitability would be augmented through the leave islands and increases in down material. This would retain more of the attributes that contribute to suitability that are not reflected in the CWHR values (Tables 3-29 and 3-30).

The analysis for Alternative 1 recognized that thinning may not reduce habitat to unsuitable through the retention of minimum canopy cover but there was an increase risk due to predation. This alternative provides similar impacts but reduces that risk by providing hiding cover in those areas most likely to be used moving from between areas of high quality habitat. Field reviews found the areas changed to Prescription E provide the best habitat for linkages including high amounts of large down logs or large rock outcrops that provide ample hiding cover. The areas chosen for Prescription E are at least ¼ mile wide and up to ½ mile wide. The areas changed to Prescription E had high quality habitat bordering the prescription making those areas the most likely to serve as conduits to other areas of high quality habitat.

Cumulative Effects to the American Marten

The historical impacts to habitat within the project area and its affect on marten are discussed in the marten cumulative effects section, Alternative 1, and the discussion of historical impacts in the cumulative effects section under vegetation within this report. Both discussions are applicable to the cumulative effects for this alternative. The changes in this alternative provide similar impacts (and therefore similar cumulative effects) with the exception of the impacts to connectivity. Alternative 1 recognized that the alternative, in conjunction with past activities reduced but did not eliminate connectivity.

This alternative would cumulatively add to past actions reducing habitat quality and reducing overall connectivity but not to the degree described under the cumulative effects section described in Alternative 1 for marten. Connectivity is not seen as a limiting factor in this alternative and therefore there would be minimal cumulative effects with regard to that issue as connectivity to areas of high quality habitat is maintained with minimal risk to individuals due to the actions in this alternative.

Pallid Bat

Affected Environment – Current Condition

Pallid bats are generally associated with dry open areas such as the desert or Great Basin; however, they are occasionally found in forest environs including hardwood communities up to 10,000 feet in elevation (Ziener et al. 1990b). The bat is most commonly found in open dry habitats with rocky areas for roosting (SNFPA 2001) and most prevalent within edges, open stands, and open areas without trees. They will roost in small colonies under the bark of trees but are more closely associated with structures such as buildings, bridges, mines, and caves. Pallid bats generally forage in open areas, close to the ground, feeding on moths, scorpions, and spiders (BCI, 2004). No surveys have been completed for this species in the project area. Bat surveys were completed around the Lake Almanor area (structures associated with PG&Es management) in 2002 as part of the FERC relicensing process but the species was not detected. There is one verified sighting of the species in Chester, CA in 1997.

The project area provides very little habitat for the species. There is cliff habitat that could provide some potential roost sites. There are also a number of buildings on private lands that could serve as roost sites. Foraging habitat on federally managed lands is very limited as evidenced by Table 3-2 indicating a general lack of openings.

Environmental Effects

Alternative 1 - Proposed Action

Direct and Indirect Effects to the Pallid Bat

The group selections would improve foraging habitat in the short term (until such time as the areas were planted or naturally reseeded). Prescription B is likely to be beneficial in providing additional forage habitat. The guidelines defined in the Proposed Action should retain sufficient trees with the appropriate roost attributes.

There is the potential for the loss of existing roost trees during operations; however, since it is unlikely this species is present in more than very limited numbers due to the lack of habitat, the risk is low.

Overall, effects to this species, both positive and adverse, are limited and the risk to the species and individuals is low.

Cumulative Effects to the Pallid Bat

The area considered for cumulative effects assessment is the project area because the direct and indirect effects and the associated risk are limited; the cumulative effects are limited as well. The Willow Forest Health Recovery Project may provide greater benefits and risks to this species; therefore, the effects discussed here may be amplified.

Past activities (Appendix A, Tables 3-29 and 3-30) have provided more foraging opportunities through increases in open habitat (OSR, SSS, and HCC prescriptions). However the declines in larger trees (OSR, HCC, TFA, and SSS prescriptions) would have reduced roost habitat. Because this bat is likely an uncommon visitor the impacts of past actions, positive and negative, have likely had little affect on overall populations.

Range activities are not seen as providing affects due to the limited impacts within the Creeks Project area. Currently one allotment (Butt Creek) is vacant and the Soda Ridge generally has limited use and current levels of use have not resulted in noticeable impacts.

Future DFPZ maintenance would limit roost areas and limit the shrub and forb layers that provide insect and arthropod habitat.

Alternative 2 - No Action

Direct and Indirect Effects to the Pallid Bat

This alternative would, over time, further reduce suitable foraging habitat and likely reduce roosting habitat, particularly within the limited hardwood complexes. Given that this species is not strongly associated with forested habitats, especially denser forested areas, the risk of this alternative to the species is limited.

The HFQLG Pilot Project was developed in part to test whether certain landscape treatments are effective in reducing the effects of stand replacing fires (HFQLG FEIS 1999). If successful, the treatments would reduce the impact to suitable habitat for this species. To date, there have been no large fires on which to base the effectiveness of the treatment and since fires are not predictable in space or time, there is no basis on which to compare not implementing the project.

Cumulative Effects to the Pallid Bat

This alternative would act cumulatively with current direction favoring retention of late successional habitat to continue declines in habitat for this species within the project area. This alternative would not act cumulatively with actions that provide forest openings or reduce the amount of canopy cover.

Alternative 14

Direct and Indirect Effects to the Pallid Bat

This alternative provides similar impacts as those described in Alternative 1. Because surveys for other projects (North Fork Feather River Relicense, Pitt 1, 2, 3 Relicense) and studies have rarely found this bat. Where it has been found, it is generally associated with buildings and riparian or aquatic habitats that would not be affected or only marginally so with this project. Therefore the risk to this bat is considered low. The changes between this alternative and Alternative 1 would lessen the amount of foraging habitat that would be created through group selections. The changes to the amount of roost habitat between this alternative and Alternative 1 are unknown and considered limited. Since the effects to habitat are similar to Alternative 1, the discussion of effects for Alternative 1 is considered applicable to this alternative as well.

Cumulative Effects to the Pallid Bat

Tables 3-39 and 3-40 outlined the changes to forested habitat within the project area. Roosting habitat is not likely to be limiting and those past actions that increased open habitats and ground vegetation would have increased the amount of suitable forage habitat. The discussion of cumulative effects in Alternative 1 would be considered appropriate for this alternative as well.

Determinations for Terrestrial TES Species Considered in this Document

Determinations are based on current species knowledge and tier to the determination found in the Biological Evaluation (BE) and Biological Assessment (BA) completed for the Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement (2004 SNFPA FSEIS). The 2004 SNFPA FSEIS determined that projects following the guidelines within the SNFPA would not lead to a trend towards federal listing for any sensitive species at the bioregional scale.

The Alternative 14 would not affect the following federally listed species or their designated critical habitat: Bald Eagle, Northern Spotted Owl, and the Valley Elderberry Longhorn Beetle.

The Alternative 14 would not affect the following FS sensitive species: Great Grey Owl, Greater Sandhill Crane, Swainson's Hawk, Greater Sage Grouse, California Wolverine, Sierra Nevada Red Fox, Pacific Fisher, Townsend's Big-Eared Bat, Western Red Bat, and Northwestern Pond Turtle.

The Alternative 14 may affect individuals, but is not likely to cause a trend towards federal listing for the following species: California Spotted Owl, Northern Goshawk, Willow Flycatcher, American Marten, and Pallid Bat.

Management Indicator Species (MIS)

The Lassen National Forest Land and Resource Management Plan identified Forest-level MIS as a means to "address habitat needs and insure viability" of wildlife species (USDA FS, 1993a 3-41). The direction for MIS follows the theory that if one species is analyzed, the findings can be presumed to be applicable to other

species that utilize similar habitats. The premise of the MIS theory has been questioned in the past (Landers et al., 1988) and in 1997, the Committee of Scientists appointed by then-Department of Agriculture Secretary Dan Glickman recommended that MIS be replaced with "focal species" (http://www.fs.fed.us/news/science). Despite the recommendation, the National Forest Management Act (NFMA) was never revised and current direction requires that analyses be performed as one measure to assure species viability.

Table 3-57 provides a list of terrestrial MIS that are neither federally listed nor listed as sensitive by the Regional Forester. The 1993 LRMP includes a number of sensitive species and federally listed species as MIS. The impacts to those species, where applicable, are provided in Section 2 of this document. The effects to TES species and their habitats are covered in the biological evaluation/ biological assessment prepared for this project. This analysis considers only those MIS that are likely to be found or where there is sufficient habitat to support the species during the seasons the species would likely occur on national forest system lands within the project area. For example, the mallard is not considered in this analysis. Although the species may occasionally occur, there is little habitat within the project area; therefore, the mallard would, at best, be an occasional visitor. Because the habitat is minimal and the risk to individuals and the species is extremely low (effects cannot be predicted) the effects to this MIS is not analyzed in this documents.

Local data for pileated and hairy woodpecker was compiled from the 2004 HFQLG migratory landbird monitoring being completed by PRBO Conservation Science (PRBO). The monitoring is set up to determine what affects projects such as the Creeks Healthy Forest Recovery Project have on migratory landbirds. PRBO has set up 10 transects of various lengths within the proposed treatment area, primarily the DFPZs. Point counts are taken and all birds heard within 50 meters of the transect point are noted.

Table 3-57. Management Indicator Species; Lassen National Forest

Species	Habitat Requirements	Applicability to Project Area
Mule deer	Early successional habitat with cover.	Considered. The project area provides suitable summer range habitat. An emphasis species for Butt Creek MA.
Black bear	Habitat Generalist, Low disturbance	Considered. Known to occur within the project area. Emphasis species for Soda Ridge MA.
Hairy Woodpecker	Open habitat with large trees and snags.	Considered. Suitable habitat is within the project area and species is known to occur
Pileated Woodpecker	Mature, closed-canopied stands. Snags present	Considered. There is suitable habitat within the project area and the species is known to occur.
Peregrine Falcon	Cliff habitat (nesting) with mixed conifer/oak (foraging).	Considered. There is a historically active nest site within the project area.
Mallard	Lake habitats	Not Considered. There are no large lakes or ponds that provide suitable habitat for this species.
Bufflehead	High elevation lakes.	Not Considered. This species is not known to occur in the project area. Nests north of Lake Almanor.
Western Gray Squirrel	Mixed Conifer/Oak Woodland	Not Considered. There no high quality habitat for this species within the project area and limited moderate quality habitat.
Osprey	Large rivers/lakes. Open stands with large snags (nest platforms)	Not Considered. The project area lacks the aquatic needs of this species.
Pronghorn Antelope	Open sage habitat (Great Basin)	Not Considered. The project area is outside the range of this species.

Source: USDA Forest Service 1993a, Appendix O

The tables included within the sections of each MIS are taken from the Forest Land and Resource Management Plan. The tables provide an overview of habitat needs to provide high to moderate habitat value within a given area. Additionally habitat suitability indices (HSI) from the CWHR (Version 8) program (Department of Fish and Game) are used as well. In general the LRMP models tend to be the more conservative of the two in terms of defining high to moderate quality habitat. As with all models these have use as prediction tools but must be used in conjunction with known data and professional judgment.

Mule Deer

Affected Environment – Current Condition

Mule Deer, an assemblage that includes both black tailed deer and mule deer, represents species associated with early successional habitats. The Final Environmental Impact Statement for the Lassen National Forest Land and Resource Management Plan (1993a) provides a brief description of the history of deer populations on the Forest. Deer populations initially increased during the early days of logging due primarily to the increase in forage. There have been significant declines in the recent past due to the maturation of brush, conversion of forage areas (brush) to timber, and the development that has occurred within both summer and winter ranges. The winter of 1993 was a significant source of declines for deer, particularly for herds on the east side. The deep snows caused substantial losses in herd numbers and to date those herds have not recovered.

In the late 1800's and early 1900's, deer in the northern portion of the Sierra Nevada's were relatively scarce. The advent of logging and increased fires significantly altered the habitat in favor of deer (California Department of Fish and Game 1964). Deer herds have subsequently declined following reductions in the use of clearcut and overstory removal prescriptions in the mid-1990s (Lidberg, personal communication 2005, California Department of Fish and Game 1998). Declines are due to a number of factors including reductions in habitat value from a variety of causes including increased disturbance associated with road traffic, declining forage, and loss of habitat due to encroachment, particularly within the winter range.

The project area is within the East Tehama Deer Herd summer range (California Department of Fish and Game 1983) which extends from the Central Valley floor east to Highway 44 near Westwood California, north to and including portions of the Lassen Volcanic National Park and south to the Almanor District boundary. The herd is estimated to have declined 25% - 35% since 1997 depending on the method of calculation (Walker, Personal Communication 2005). The current estimate ranges between 14,700 and 15,600 individuals based on CDF&G statistics. The number of deer that utilize the project area is unknown. The habitat value within the project area is relatively low but meets the definition of moderate based on the LRMP model. The relatively low habitat values are attributed primarily to high open road densities throughout most of the project area and very low forage to cover ratio. Table 3-58 provides the habitat attributes that are used to model the impacts to this MIS.

A number of factors have combined that have adversely affected the amount of suitable habitat within the project area. While forests have seen a reduction of the larger trees from timber harvest (as described in the vegetation section of this report as well as the silvicultural section), conversely there has been a substantial growth in the overall amount of tree biomass (higher densities of smaller trees), which in turn has caused a decline in the amount of understory vegetation that provided forage to ungulates (Oliver et al 1996, Peek et. al. 2001). This loss of understory biomass has been related to declines in mule deer (Peek et. al. 2001). The 2001

SNFPA FEIS and the 2004 SNFPA ROD and FSEIS recognize that the overall goals within the amendment (such as the standards and guidelines applicable to this proposed project) would have an adverse affect on deer because of the goal of increasing forested habitats and reducing fuels (including shrubs) which provide cover and forage (2004 SNFPA FSEIS 4.3.3). In contrast, the HFQLG FEIS (1999, 3-98) determined that projects such as these (DFPZ and group selections) would provide a minor improvement in habitat. However, as Skinner (2005) points out, with respect to group selections, openings of this size (less than 2 acres) are unlikely to develop any substantial forage due to shading. DFPZs and where any herbaceous or shrub layer does establish, is likely to decline over time due to natural regeneration of conifers within the groups.

Currently, preferred forage species are declining in both amount (numbers of plants) and value. Several species preferred by deer are found in the project area. The most abundant is white thorn ceanothus (*Ceanothus cordulatus*), however there are limited amounts of deer brush (*Ceanothus integerrimus*) and bitter cherry (*Prunus emarginata*). Manzanita (*Arctostaphylus spp*) and chinquapin (*Chrysolepis sempervirons*) are found in various amounts throughout the project area but provide very little forage value. In 1995, the Department of Fish and Game analyzed the protein value of whitethorn, a staple shrub species for deer (Walker, personal communication). The analysis found that crude protein was at 7% as opposed to optimally having 16% crude protein. A review of plant conditions also found that nearly all of the key forage species were heavily hedged. Deer forage primarily on the new annual growth and Walker (personal communication 1995) stated that in his surveys new annual growth was hard to find, indicating that there was strong competition for forage. Given that forage conditions have diminished since 1995, forage conditions are likely to be worse than in 1995.

Table 3-58. Selected habitat attributes for high and moderate habitat value (mule deer)

Habitat Variable	High	Moderate
Cover Stands	Ponderosa Pine Mixed Conifer, Red Fir: CWHR 2B, 2C, 3B, 3C, 4B, 4C, and 5. Riparian Deciduous, Aspen	Lodgepole Pine, Ponderosa Pine, Mixed Conifer, Red Fir: CWHR 2A, 3A, 4A Cottonwood, Black Oak, Montane Shrubs
Shrub Age Class	Mature	Decadent
Forage Stands	Riparian Deciduous, Montane Shrub, Black Oak, Aspen, Wet Meadow, Grass, Forbs, Seedling, Sapling (conifer)	Ponderosa Pine, Red Fir, Mixed Conifer 2A, 3A, 4A, Wetlands
Distance to Cover	<400 Yards	400 – 500 Yards
Shrub Age Class	Young	Mature - Seedling
Open Road Density	<2.5 mi/sq.mi	2.5 mi – 6 mi/sq/mi

Source: USDA Forest Service 1993a Appendix O-14

Environmental Effects

Alternative 1 - Proposed Action

Direct and Indirect Affects to Mule Deer

Thinning projects that meet current direction as outlined in the 2004 SNFPA ROD generally favor species that prefer dense canopies and discriminate against species that favor more open or early successional habitats such as deer.

With respect to this project, treatments would have a positive impact on deer within the project area by modestly increasing forage availability adjacent to areas providing cover, thus improving the forage to cover ratio. Currently the forage to cover ratio is approximately 20:80. Ideally the ratio for high quality habitat is at least 60:40. The 1993 LNF LRMP model for deer recommends that forage be at least 50% for moderate habitat capability (Table 3-58). Currently the habitats that might be classified as forage equates to approximately 4,150 acres within the project area or approximately 14% of the federally managed lands. Based on the silvicultural data and the analysis completed for this species, cover is not a limiting factor for deer. Although nearly 14% of the habitat is considered forage, the value of that forage is often low to moderate. The shrub species within the project area are often decadent due to age and therefore contribute little to available high quality forage. In other cases, the amount of forage is declining as canopies (in the more open timbered stands) become denser.

The proposed thinning would not lead to any meaningful increase in forage, as the stands would generally remain too dense for an increase in shrub or herbaceous growth, although some small gains in openings (skid trails, landings) may occur. Group selections would provide some increase in forage; however, the groups are not large enough to provide long-term gains and as stated earlier may be too small for shrubs to develop (Skinner, 2005). Eventually, natural regeneration of conifers would supplant the shrub and herbaceous cover.

The road maintenance activities and construction of landings and skid trails along with other associated activities such as the proposed road construction and decommissioning (including skid and temp roads and landings) would have no measurable affect on habitat values as the habitat lost would generally be cover, which is not limiting. Fawning habitat is generally associated with riparian habitats, which would not generally be affected by project activities and is a vegetative community that is fairly widespread within the project area. The group selections would provide localized improvement to forage for several years until conifers become reestablished at which time habitat values would decline (assuming no other changes in habitat).

The project area would continue to meet moderate habitat value (based on the attributes in Table 3-58) due to the continued limiting forage and high road densities in most areas. Overall the habitat meets Forest plan direction for emphasis species; however, habitat values would continue to decline over time. Because the overall project would result in a slight improvement initially, the project is not likely to impact current population trends. The project would have no measurable affect on population trends as deer might only be indirectly affected by implementation (disturbance to individuals that causes them to move) and improvements in forage are not enough to offset conditions elsewhere throughout the summer range.

The proposed action includes treating group selections in the future, removing competing vegetation around established conifers. This would reduce future forage opportunities in these areas but as the entire group would not be treated, the effect is likely to be minimal. The treatment is, however, likely to hasten the establishment of conifers and therefore reduce the amount of time that groups provide quality forage habitat.

Cumulative Effects to Mule Deer

For all alternatives the cumulative effects considers past changes within the project area and the effects those changes may have had on this species and also compares the amount of habitat within the project area to the estimated amount for the District. Considering areas beyond the District would dilute the impacts. Initial vegetation treatments within the project area (Appendix A, Table3-29) favored deer (Walker 1995). The attributes that contribute to stand and landscape heterogeneity most favored by deer is ground vegetation,

which increased under treatment prescriptions such as OSR, HCC, and SSS. This attribute has declined through an emphasis on TFB and TFA before that. While these prescriptions provided hiding and fawning cover, it is unlikely that cover was ever lacking within the project area. The decline in ground vegetation as a stand component has resulted in declining habitat value for deer within the project area.

As described earlier, the deer herd that utilizes the area is part of the Tehama Deer Herd which serves as the area consider for cumulative effects. The treatments that have occurred in the recent past have provided some limited benefit to deer. The stands treated with an overstory removal prescription have developed moderate to high quality forage values but those values have declined as the planted conifers begin to shade the shrubs and shrub become more decadent with age. Thins such as the Ruffa and Shanghai-Fanani sales provided little improvement in the overall forage conditions and resulted in some reductions in cover.

Overall, the Almanor District provides approximately 220,000 acres of high value cover and additional 43,000 in moderate value (cover) habitat based on the criteria in Table 3-58. The total amount of high quality forage habitat (Table 3-58) is estimated to be 35,000 acres and additionally (approximately) 24,000 in medium quality forage. The total acres of forage are approximately 22% of the total cover habitat. The emphasis on the retention of late successional habitat and the maintenance of crown closures at or above 40% along with the emphasis on fuels management is likely to adversely affect the amount of forage but continue the trend of increased coniferous canopy coverage. The figures above do not consider the proximity of the cover and forage and based on a review of the dispersion of forage across the district, there is likely less forage available within proximity to cover.

The group selections would add to the overall amount of shrub available for the East Tehama deer herd and in areas where cover is available. This would act cumulatively with other thinning projects to help provide more high quality forage in proximity to high quality cover. The project area contains less than 14% of the forage available to the herd that is found within the Lassen National Forest. The impact to forage (based on Tables 3-2 and 3-6) is positive and moves the project area closer to the desired condition for deer. Thinning on private lands has made some limited improvements in the forage to cover ratio adjacent to the project area. The Willow Forest Health Recovery Project is also likely to add some improvements as well. The Humboldt Summit completed in 2005 also provided an improvement to forage conditions in an area between the Willow and Creeks project.

Range activities are likely to cause a minor reduction in forage but that affect is very localized due to management practices and not sufficient to cause a measurable impact to forage availability. Deer are browsers by nature, utilizing high protein shrubs. Cattle prefer grass and soft palatable leaves such as aspen and willow in the later part of the season. The active allotment (Soda Ridge) provides sufficient forage for cattle and therefore competition for species preferred by deer is likely very limited.

Road densities (per the watershed section of this document) are currently fairly high, contributing to low to moderate habitat value based on the model presented in Table 3-58. This project decreases overall open road densities and therefore would provide an improvement to overall habitat conditions.

Locally, Department of Fish and Game biologists believe that long-term declines in habitat condition, starting in the 1930s and continuing today, are instrumental in the decline. Lack of habitat disturbance, especially from fire, has decreased habitat value for deer and other wildlife in much of the state's forested areas. Deer and numerous other wildlife thrive on early successional vegetation that grows back in the first few

years after fire. Without periodic fire, the habitat becomes old, or "decadent," and is unable to support wildlife populations of the past. Indirect consequences, such as increasing competition with livestock and overuse of ranges by deer themselves, are typical California Department of Fish and Game 2005). The condition of the winter range for this deer herd has had some increase in forage value due to the Gunn II fire and several other large scale fires in recent years. That has, presumably, resulted in deer entering summer range in better condition, increasing the potential for fawn survival. Increasing the value of the summer range would increase deer winter survival and the potential for increases for deer numbers the following year. This project may provide minimal improvements in summer range habitats. The improvement is not likely to result in measurable improvements due to the small amounts of increased forage but may act cumulatively with future projects such as Willow to improve summer range on the Forest.

There are no statistics for the number of deer taken within the project area during hunting season. The Department of Fish and Game estimates that about 5% of the herd is taken annually (1:19). The project may provide a slight increase in hunter success through cover reductions particularly near forage areas.

Alternative 2 - No Action

Direct and Indirect Effects to Mule Deer

This alternative would continue the decline in deer habitat including a reduction in forage habitat and the value of the forage that remains. Forage to cover ratios would continue to decline contributing to declines in the overall available habitat for the Tehama deer herd.

This alternative would continue the trend of moving habitat values away from meeting moderate habitat capability for deer as per current direction within the Butt Creek Management Area where deer are a MIS emphasis species.

The HFQLG Pilot Project was developed in part to test whether certain landscape treatments are effective in reducing the effects of stand replacing fires (HFQLG FEIS 1999). If successful, the treatments would reduce the impact to suitable habitat for this species. To date, there have been no large fires on which to base the effectiveness of the treatment and since fires are not predictable in space or time, there is no basis on which to compare not implementing the project.

Cumulative Effects to Mule Deer

Because there are few identifiable and measurable direct and indirect effects, there are no predictable cumulative effects although trends would continue. This alternative would further reduce deer habitat within the project area and cumulatively within the Forest in keeping with direction favoring late successional species.

Range activities may provide for limited amounts of competition but that may increase as preferred browse species decline in numbers and the quality of the browse.

Current road densities would continue to contribute to lower habitat values within the project area.

Alternative14

Direct and Indirect Effects to Mule Deer

This alternative would have essentially the same direct and indirect effects as Alternative 1 and therefore the effects discussion in Alternative 1 is applicable to this alternative. The reduction of group selections would reduce the amount of potential foraging habitat that is considered the habitat feature that is most lacking within

the project area therefore this alternative is seen as being slightly less positive for deer but notably better in terms of habitat improvement than the No Action alternative.

Cumulative Effects to Mule Deer

This alternative would have essentially the same cumulative effects as Alternative 1 and therefore the cumulative effects discussion in Alternative 1 is applicable to this alternative.

Black Bear

Affected Environment – Current Condition

The black bear was selected as a MIS to represent mammalian species that utilize riparian and meadow complexes along with forested habitats. Little data is available on the current status of bear. The California Department of Fish and Game (2005) reports that statewide bear populations are trending upwards. In 1982 the population was estimated to be at 10,000 to 15,000 individuals. Presently the statewide population is believed to be between 25,000 and 30,000. The Department of Fish and Game (2005) estimates that within Plumas County bear populations average .5 to 1.0 bear per square mile. That would make the District estimate to be between 325 to 650 individuals and 25 to 50 individuals within the project area. The Department of Fish and Game also notes that over two thirds of the bear habitat is within lands managed by the Forest Service and the National Park system.

Habitat throughout the Almanor Ranger District is generally of moderate value (due primarily to road densities greater than 1/2 mile per square mile). Table 3-59 provides the habitat attributes that are used to model the impacts to this MIS.

Bears are omnivorous, opportunistic feeders commonly consuming ants and other insects in summer, but prefer nut crops, especially acorns, and manzanita berries in the fall. As omnivores, black bears and will eat whatever seems edible. Mostly they are plant eaters, but they have been reported catching and consuming young deer fawns. Bears frequently adapt to human presence, often because bears are attracted to human garbage, pet food and other food items (California Department of Fish and Game 2005, Zeiner et all 1990).

Table 3-59. Selected habitat attributes for high and moderate habitat value (black bear)

Habitat Variable	High	Moderate
Year Round Vegetation	Coniferous Forest	Coniferous forest
Spring Vegetation	Meadow Riparian	Meadow Riparian
Summer/Fall	Montane Shrub	Montane Shrub
Fall	Oak Woodland	Oak Woodland
Dead and Down Wood	30 – 40 Tons/acre 65% in 10"+ sound wood and the remainder in 3"+ rotten wood.	20 – 30 tons/acre of 65% in 10"+ sound and the remainder in 3"+ rotten wood.
Road Densities	<1/2 Mile/Sq. mi	1/2 Mile/Sq. mi – 5 Mile/sq mi.

Source: USDA Forest Service 1993a Appendix O-3

Environmental Effects

Alternative 1 - Proposed Action

Direct and Indirect Effects to Black Bear

There are few affects associated with this alternative. Bear, being a habitat generalist, can utilize a wide range of habitats and food sources. The project would reduce surface fuels (foraging habitat over approximately 27%

of the project area. The additional roads would provide further reductions in cover and forage and temporarily add new areas susceptible to disturbance. Post treatment conditions would result in slight reductions in the potential for disturbance through planned road decommissioning.

The LRMP model (Table 3-59) provides no quantifiable measure of habitat suitability base on vegetation therefore the CWHR (Version 8) was reviewed as a means to determine the potential project affects. Habitat suitability indices (HSI) for black bear indicate that the preferred coniferous habitats are those that have small trees (12" – 24" dbh) and have either sparse canopy (foraging habitat) or moderate canopy cover (thermal and hiding cover). This is the case for both red fir and Sierran mixed conifer habitats. Aspen is noted as having high habitat values where the stands are composed of medium to large trees with moderate canopy cover (40% - 60%). Based on the HIS models, the project would maintain the cover elements most preferred by this species.

Since the project area contains little oak woodland habitat and none of the preferred fall habitat would be affected, there would be no affect to these foraging areas.

The fuels objectives would reduce the amount of smaller material within the treated stands and the down wood component would not meet moderate habitat capability although it is likely the amount of large sized material would increase slightly. Areas outside the treatment zones are likely providing this attribute such that there is sufficient down wood in the landscape to meet the needs for this species. Therefore, the risk to the species is considered low and population trends would not be affected.

Cumulative Effects to Black Bear

For all Alternatives the cumulative effects considers past changes within the project area and the effects those changes may have had on this species and also compares the amount of habitat within the project area to the estimated amount for the District. Considering areas beyond the District would dilute the impacts. Two variables identified in Table 3-30 as contributing to stand heterogeneity that are important habitat attributes to bear are ground vegetation and decadence, particularly down wood. The advent of road construction also increased the importance of hiding cover provided by two or more canopy layers. Past actions have generally provided more areas of forage in shrubs, but have, particularly in recent years, caused declines in the amount of down log habitat. Most treatments, particularly OSR, HCC, and SSS prescriptions have reduced hiding cover over 25% of the project area. Thinning prescriptions, particularly TFA and PSS, have reduced the complexity of the stands through reductions in overstory canopy.

The District contains over 300,000 acres of coniferous forest of various compositions and age classes, therefore cover is not seen as a limiting factor. Road densities in some watersheds (such as Yellow Creek) and a lack of forage across the Forest tend to be limiting factors for bear. Past sales not only in the project area (Appendix A) but throughout the District have resulted in minor improvements in forage through the increase in large down woody material and occasional retention of existing shrubs. However sales completed in the last decade treated fuels through a combination of tractor piling and burning, limiting the amount of forage habitat (insects, grubs, etc). Riparian vegetation and species such as elderberry, manzanita, and other forage plants continue to decline due to increasing conifer cover and lack of disturbance, with the exception of the occasional large fire such as the Gunn II and Storrie. These large scale disturbances affect a relatively small part of the district and therefore may make local habitat improvements but have little affect on the general population trends.

The Creeks project proposed additional roads but these are compensated by closures. Road construction would affect cover but given that cover is not a limiting factor, the impact would be difficult to quantify. Additional roads constructed for other projects (Willow Forest Health Recovery Project and on-going projects) would continue to degrade habitat to a point that overall habitat values would remain low to moderate.

Past activities within and adjacent to the project area (Appendix A, Table 3-29 and 3-30), especially those that are designed for fuels reduction, have impacted the amount of down wood material, reducing the down wood component in most treated areas to amounts well below that needed to meet moderate or high habitat values. Planned activities such as DFPZ maintenance would retain these lower values. Overall, due to the retention of late successional habitats that would not be treated, the down wood component is expected to remain sufficient to meet at least moderate habitat capability throughout the District if viewed at a landscape level. Treatment limitations within the RHCAs and the area were the fish-bearing stream prescription would be used to improve habitat connectivity for marten would provide high quality forage due to the higher level of down wood material.

The black bear is legally hunted in California. According to California Department of Fish and Game statistics, 1,848 bear where killed statewide in 2004 with 79 taken in Plumas County. The number, if any, taken in the project area is unknown. The project may give hunters slightly greater access to areas at certain times if temporary roads are open during hunting season or when the proposed roads are constructed. The road closures may, conversely, reduce access to other areas. While the potential cumulative effect is recognized, the impact is difficult to assess without data on the use of the area by hunters.

Current road densities are cited as one factor contributing to a habitat value of moderate within in the model. This project would add new roads and reestablish temporary roads for the duration of the project. However the new roads are not within areas of high quality habitat and are not likely to further exacerbated disturbance. Therefore the roads may increase (cumulatively add to) the effective road densities but are not likely to have measurable impacts to local bear numbers.

Alternative 2 - No Action

Direct and Indirect Effects to Black Bear

This alternative would have no measurable affects on this species, as the alternative would not produce any changes in the habitat attributes outlined in Table 3-59. Overall, the quality of the habitat would remain such that moderate habitat values are marginally met for this species, an emphasis species for the Soda Ridge Management Area.

The HFQLG Pilot Project was developed in part to test whether certain landscape treatments are effective in reducing the effects of stand replacing fires (HFQLG FEIS 1999). If successful, the treatments would reduce the impact to suitable habitat for this species. To date, there have been no large fires on which to base the effectiveness of the treatment and since fires are not predictable in space or time, there is no basis on which to compare not implementing the project.

Cumulative Effects to Black Bear

As there are no identifiable direct and indirect effects associated with this alternative, there are few identifiable cumulative effects. Current management direction may provide some long-term impacts but those have not

been identified. Most cumulative effects that would result in habitat changes would be sporadic (unpredictable) events such as fire or drought.

Hunting may be made more challenging through increases in cover. However that would be tempered by the amount of hunters using dogs.

Alternative 14

Direct and Indirect Effects to Black Bear

This alternative provides slightly better habitat conditions within Prescription E as that prescription provides more hiding cover within those stands and provides a higher amount of forage habitat in terms of down wood. The benefits are limited to the areas changed for this alternative and therefore the overall benefit to bear at the project area (landscape) level is limited.

As the overall affects are similar, the discussion of effects for Alternative 1 is applicable to this alternative with the exception of the areas in Prescription E.

Cumulative Effects to Black Bear

The cumulative effects for this alternative are essentially the same as Alternative 1. The cumulative impact of the continued decline of down wood is slightly less with this alternative and intra-stand heterogeneity that has been reduced due to past practices would increase with the implementation of small groups and Prescription E.

Hairy Woodpecker

Affected Environment – Current Condition

Hairy woodpeckers serve as a MIS for species that prefer more open habitats containing large conifers. Suitable habitat for hairy woodpeckers is characterized by mature trees of moderate to large size within relatively open stands (Siegal and Desante, 1999). Caution must be used in interpreting the terms moderate to large. For purposes of woodpeckers, research generally considers 20 inches (51 cm) a large tree. This, however, is not large when considering the potential for most coniferous species in the project area. Current Breeding Bird Survey data indicates that the hairy woodpecker population is stable (PRBO Conservation Science 2005). Table 3-60 provides the model used to predict effects to this species.

The Almanor District provides approximately 42,000 acres of high quality habitat for hairy woodpecker based on the most recent stand data. An additional 34,000 acres would be considered moderate habitat. As discussed earlier, snags across the landscape are primarily "soft", providing high quality nesting habitat. The model sites white fir as being the preferred nest tree species and based on the composition of most stands, white fir would be the most plentiful snag species followed by species composing moderate habitat capability. Snag densities, especially for snags of the preferred size, are generally below the range of variable for high quality habitat but most areas of the district provide at least moderate habitat capability for hairy woodpecker.

Hairy woodpecker were detected in each of the 10 PRBO survey transects within the treatment areas. Most transects recorded 1 to 2 birds each time the transect was sampled. Based on the data, while the bird is not numerous within the project and treatment areas, the species is widespread. This woodpecker was found in conifer stands that were in CWHR 4 and 5 size classes, with open to moderately dense stands.

The project area contains little high or moderate value habitat when vegetation type alone is considered. Based on Table 3-2, there is approximately1,592 acres of high quality habitat (or less than 3% of the District total) and an additional 366 acres of moderate habitat (approximately 1% of the District total for moderate

vegetation type). Riparian habitats are generally inclusive of coniferous stands due to the incursion of conifers throughout riparian systems. As stated the HSI model tends to be more liberal in defining suitable habitat. The HSI model indicates that the project area provides 10,845 acres of high quality habitat.

Table 3-60. Habitat attributes for high and moderate habitat value[1] (hairy woodpecker)

Habitat Variable	High	Moderate
Vegetation Type	Mixed Conifer / Red Fir 4A, 4B	Subalpine Forest Eastside Pine Riparian –deciduous Ponderosa Pine Douglas-fir All 4A, 4B
Nest Site Condition	Soft Snag	Hard snags, dead portion of live tree
Nest Tree Sp	White fir	Pine Red Fir Aspen, Cottonwood
Forage	Hard Snags	Soft Snags
Ave Nest Tree Diameter	>24[2] inches	15 – 24 inches
Snag Density	3.5/acre Ratio hard: soft 3:1	1.5 – 3.5/acre Ratio hard: soft 2:1 – 3:1

Source: USDA Forest Service 1993a Appendix O-10
[1]Strata labels are derived from Appendix U, Lassen National Forest 1993 LRMP. 4A = CWHR 5S, 5P, 4B = CWHR 5M.
[2]This differs from 1993 LRMP direction and is based on more recent research (Laudenslayer etc)

Environmental Effects

Alternative 1 - Proposed Action

Direct and Indirect Effects to the Hairy Woodpecker

The HSI models (CWHR Version 8) indicate that the highest quality habitat in red fir is found within stands with medium to large trees and sparse to open habitats. Within Sierran mixed conifer vegetative communities, the highest quality habitat is provided in stands with small (12" – 24"dbh) and medium to large trees (greater than 24"dbh) and open, sparse, and moderate canopy cover. Sound snags are preferred for reproduction and all decay classes (sound and rotten) being preferred for cover and feeding. Shrubs and grasses are also a positive habitat characteristic based on the HSI models.

While the stands being treated contain the larger trees favored by this species, the dense canopies (exceeding 50% in many cases) reduce the suitability of the habitat. Thinning is expected to reduce the stand densities, an action that would favor this species. The snag data (Table 3-31) indicates that at the landscape level the project area provides low habitat value due to the general paucity of hard snags. The retention of hard snags (anticipated to be approximately 2/acre within all treated areas combined) would increase the overall number of snags, improving foraging conditions and future nesting habitat (soft snags). Snag guidelines (Appendix D) prioritize selecting the larger conifers for retention. However, because white fir is the dominant tree, the criteria favor retaining snags from species that would contribute to moderate habitat capability for this species. Regardless, overall the selection criteria for snags would provide habitat attributes that favor this species (Saab and Dudley, 1998). Population trends would remain unaffected by the project; or if affected,

positively so. Snag recruitment of the preferred white fir would likely increase through the planned underburning.

The project would slightly increase the amount of vegetative cover for high quality suitable habitat based on Table 3-60 and slightly lower the amount of amount of high quality vegetative cover based on the HSI model. The treatments would likely have little affect on the distribution of preferred nest trees as snags over 24" DBH would be preferentially selected especially if there is current use noted.

Cumulative Effects to the Hairy Woodpecker

Applicable to all alternative, the cumulative effects considers past changes within the project area and the effects those changes may have had on this species and also compares the amount of habitat within the project area to the estimated amount for the District. Considering areas beyond the District would dilute the impacts. The affect that historical changes in the composition of vegetation within the project area may have had on this species are unknown. Past vegetation management actions within the project area have resulted in an increase in the open habitat, although stand densities remain higher than preferred by this species. Prescriptions that favored this species were primarily the shelterwoods (PSS and SSS) and perhaps the OSR (Table 3-30). However these treatments also reduced habitat attributes (variable density and decadence) that favored the species. Overall, it is likely that past treatments resulted in lower habitat values overall due to decreases in decadence (snags) within treated stands.

Nesting habitat, which Saab et al. (2004) described as groups of snags has declined due to fuels management activities and salvage harvest throughout the District, particularly in roaded areas. This project may add to nesting habitat losses, however, project designs specifically address the retention of snag groups; therefore, nesting habitat would be retained across the landscape and the Proposed Actions would have little cumulative effect. If, as the model indicates, white fir is the species most preferred for nesting, habitat conditions may have improved. Harvest practices reduced canopies to the preferred densities but those same activities also reduced available nest sites.

The Storrie Fire provided a large area in the southern portion of the project with habitat attributes that favor this species. Fire related mortality, particularly in large conifers continue, although the rate has slowed. This mortality continues to provide nesting habitat for this species. With regard to fire salvage harvest, Saab and Dudley (1998) and Saab et al. (2004) report that fire can increase the amount of nesting habitat through the generation of snags, but that hairy woodpecker nest in unlogged areas that have been burned areas at rates significantly higher than areas that have been logged after a fire. However, both treated (salvage logged) and untreated areas had higher levels of nesting than areas unaffected by fire.

Although underburning would likely increase the number of snags, planned maintenance within the DFPZ is likely to reduce the overall number of snags in order to maintain a margin of safety for fire fighters. Since the area thinnings (also scheduled for prescribed burning) would not receive maintenance treatments, the overall number of snags would be projected to modestly increase, regardless of maintenance activities.

The project would affect less than 4% of the estimated high quality suitable habitat on the District using the LRMP Model. Overall, while this species is relatively uncommon, the relative impacts to the amount of habitat available at the District level are considered minimal; therefore, the risk to the species (and affects to population trends) is low. Because the project would have little impact on the amount of moderate and high

quality habitat within the District and less at the Forest scale, the overall project is not expected to affect this species or population trends on the Forest.

Alternative 2 - No Action

Direct and Indirect Effects to the Hairy Woodpecker

This alternative would lead to a continued decline in more open stands but would be expected to lead to an increased number of snags and an increase in the ratio of hard to soft snags (increased forage habitat). Snag development would likely be in groups, which is favored by this species for nesting (Saab et al., 2004), and snags are likely to be comprised of larger trees as they tend to be more susceptible to mortality due to stress.

The HFQLG Pilot Project was developed in part to test whether certain landscape treatments are effective in reducing the effects of stand replacing fires (HFQLG FEIS 1999). If successful, the treatments would reduce the impact to suitable habitat for this species. To date, there have been no large fires on which to base the effectiveness of the treatment and since fires are not predictable in space or time, there is no basis on which to compare not implementing the project.

Cumulative Effects to the Hairy Woodpecker

Current direction favors the retention of denser stands throughout the Sierra's, with allowance for projects completed under the HFQLG FEIS (1999). This direction would maintain denser stands as a dominant feature and, therefore, act cumulatively with the no-action alternative.

Alternative 14

Direct and Indirect Effects to the Hairy Woodpecker

This alternative would provide essentially the same habitat characteristics as Alternative 1 therefore the analysis completed for Alternative 1 is considered to accurately portray the effects for this alternative as well.

Cumulative Effects to the Hairy Woodpecker

The cumulative effects associated with this alternative are essentially the same those for Alternative 1.

Pileated Woodpecker

Affected Environment – Current Condition

This MIS represents cavity nesting species that prefer dense, mature stands. Pileated woodpeckers prefer large, live trees (for foraging and nesting) within moderate to densely stocked stands (Robinson and Alexander 2002). Research by Bull and Meslow (1977), Zeiner et al. (1990a) indicated that pileated woodpecker territories are approximately 120 hectare (ha.). However, later work by Bull and Holthausen (1993) found a wide variety of territory size and recommended that areas approximately 364 ha. (approximately 900 acres) in size be managed for pileated woodpecker. There is no local data on population numbers although the national population of Pileated Woodpeckers, as reported by the U.S. Fish and Wildlife Service's Breeding Bird Survey data (1966-1999), is significantly increasing at a rate of 1.4% per year; in California, Pileated Woodpeckers are increasing non-significantly at a rate of 0.4% per year (Sauer et al. 1999). Density estimates range from one pair per 160-220 ha. (395-544 acres) in California to one nesting pair per 356 ha. (879 acres) in northeast Oregon (Bull and Jackson 1995). The effects are estimated through the analysis of habitat characteristics within the Creeks project area.

The pileated woodpecker is largely dependent on dead wood (standing and down) for foraging (Bull and Holthausen, 1993). Carpenter ants, wood-boring beetles, and larvae (Zeiner et al., 1990a; Schroeder, 1983) are the primary prey items. The species is a primary cavity nester utilizing dead or dying trees (Decay Class 1 or 2). Local data on the size of nest trees has not been established. Schroeder (1983) reports that the mean nest tree size in Oregon was 76 cm (30 inches) dbh with a minimum nest tree size of 51 cm (20 inches) dbh. In addition, Schroeder (1983) specified that suitable habitat is defined as stands with canopy closures greater than 25% and at least 1 snag/acre greater than 20 inches dbh.

The District contains approximately 53,000 acres of forested stands that meet the criteria for high quality habitat if vegetation type alone is considered. An additional 13,000 acres would be considered as moderate habitat. Nest sites are limited due to snag declines from previous management activities, particularly road hazard and the removal of dead and dying trees. Aspen, which provide high quality nest sites have been noted to be declining on the Almanor District as they have elsewhere on the Forest, primarily due to the increase in conifers within riparian hardwood stands. The project area has relatively little area that provides high to moderate habitat value based on vegetation type alone. According to Table 3-2, there are 1,309 acres of high quality habitat when vegetation alone is considered (2% of the District total) and an additional 117 acres of moderate habitat (1% of the District total).

PRBO point counts have repeatedly detected this species since 2002 within the treatment areas indicating that the bird is well represented on National Forest System lands across the project area. In 2004 this species was detected at 7 of 10 transects at an average of approximately 1 bird per transect. The pileated is most numerous in the south half of the project area. Not surprisingly the pileated was most closely associated with CWHR size class 4 and greater within moderate to dense stands.

Table 3-61. Selected habitat attributes for high and moderate habitat value (pileated woodpecker)

Habitat Variable	High	Moderate
Vegetation Type and Successional Stage	Mixed Conifer 4B, 4C, 5	Ponderosa Pine, Red Fir 4B, 4C, 5 Riparian, Aspen
Nest Sites	Snag, Aspen (live)	Dead Portion of Live Tree
Snag Densities around Nest Tree	1 – 2 acre patch of >8 snags/acre >20 inch dbh	1 – 2 acre patch of 3 – 8 snags/acre >20 inch dbh
Snag Ration (Hard: Soft Snag)	3:1	2:1 – 3:1
Feeding Sites	Snags and Down Logs >25" dbh	Snags and Down Logs 18" – 25" dbh.

Source: USDA Forest Service 1993a Appendix O-17

Environmental Effects

Alternative 1 - Proposed Action

Direct and Indirect Effects to the Pileated Woodpecker

Currently there is approximately 7,200 acres of dense canopied stands retained in spotted owl and goshawk protected activity centers within the project area. These areas would provide suitable habitat over at least 25% of the federal lands within the project area however most areas would not meet the criteria for high or moderate quality habitat due to the snag densities and age and size class of the stands. In addition, riparian habitats that support aspen would remain generally unaffected and would continue to provide low to moderate habitat value, since most aspen habitat is declining due to competition with conifers. There are additional areas of suitable habitat; however, these are generally smaller stands, surrounded by unsuitable or low value habitat.

Even though these areas may have limited use as an established territory, these isolated pockets of habitat would be useful for dispersion.

In addition to the LRMP model (Table 3-61) The CWHR Habitat Suitability Program (Version 8) was reviewed. The CWHR HSI model indicates that CWHR 4M, 4D and 5P provide moderate habitat suitability for nesting and foraging while CWHR 5M, 5D, and 6 provide high habitat suitability. Utilizing strata labels and the data from Table 3-2, approximately 57% of the project area currently provides moderate habitat capability while only 5% is highly suitable. Table 3-6 suggests that there would be approximately 3% reduction in suitable habitat (with 2% increase in highly suitable habitat due to increases in the size class of the dominant tree). The remaining habitat falling in the moderate to high suitability category that has been treated in the last decade would likely be of moderate habitat value due to reductions in snags and any subsequent down wood recruitment.

Bull et al. (2005) concluded that fuels reduction projects do not necessarily preclude use by pileated woodpecker, if sufficient down wood and snags are retained. In the study, Bull et al. looked at foraging within fuel treatments where logs greater than 4" dbh were part of the retention standards. The project would retain 10 – 15 tons/acre, preferably in logs greater than 12"dbh and retain snags (per Appendix D) sufficient to meet the foraging needs as described in the study. The study reviewed the impacts of implementing both mechanical thinning (TFB) prescriptions where residual stocking (basal area) was substantially lower than that called for in this alternative (80 ft^2 per acre vs. 125 ft^2 per acre within DFPZs). Bull found that there was a decrease in use within the treated stand when compared to control but that habitat was still sufficient to support foraging. However, utilization of burning as a fuels reduction technique seriously impacted foraging as ant (the main food item for pileated woodpeckers) populations were significantly reduced. Based on the data supplied, the snag and down log retention guidelines are expected to retain sufficient foraging substrates as described by Bull et al. Interestingly, Bull et al. (2005) noted no detectable difference in foraging between controls and treated stands in other woodpeckers.

The thinning associated with this project is expected to result in very subtle changes to the overall habitat value within any given territory making predictions of impacts difficult. There would be little change in cover values and the thinned stands would remain above 35% canopy cover overall. The group selections affect a very limited area overall and are distributed in a manner that would minimize the impact to any existing territories. Snag levels needed to meet suitability standards (at least one/acre over 20 inches dbh) would be reduced but should be sufficient to meet at least moderate habitat capability. Bull et al. (1993) reviewed the effects of thinning and found that activities such as those proposed in this alternative (fuel reduction) may impact habitat elements but not sufficiently to adversely affect forage habitat or primary forage species (ants). Habitat surveys completed in this area (as well as others) indicate that fuels treatments retain sufficient down wood material to meet minimal habitat requirements.

Cumulative Effects to the Pileated Woodpecker

The cumulative effects for all alternatives considers past changes within the project area and the effects those changes may have had on this species and also compares the amount of habitat within the project area to the estimated amount for the District. Considering areas beyond the District would dilute the impacts. Habitat attributes important to this species that are indicative of a heterogeneous stand include multiple canopies and decadence, both standing and down logs. Almost all past silvicultural prescriptions have adversely affected

these habitat attributes. All silvicultural prescriptions, other than those used for salvage and TFB, removed the larger dominant trees within the stand. Sanitation prescriptions (ISC) removed those trees that would have contributed to nest habitat and future down wood recruitment.

Because the project primarily depends on TFB prescriptions, there are few discernable cumulative effects with this alternative. The actions considered in this analysis are not expected to have the measurable impact to habitat that shelterwood harvest, clearcuts, and thins using CASPO prescriptions have had within the project area and throughout the District. Actions on private grounds may further reduce canopy cover but observations indicate most past treatments on the local private grounds (excluding the recent fire salvage, clearcuts, and overstory removal) surrounding the project area would maintain at least minimal habitat attributes and provide moderate habitat capability. Other planned projects on federal lands (the Willow Forest Health Recovery Project) would likely have results similar to these. Given the ages of the coniferous stands, thinning utilizing the prescriptions in this analysis is unlikely to result in meaningful losses of high quality habitat; therefore, the risk to species populations is low.

Because the project would have little impact on the amount of moderate and high quality habitat within the District and less at the Forest scale, the overall project is not expected to affect this species or population trends on the Forest.

Alternative 2 - No Action

Direct and Indirect Effects to the Pileated Woodpecker

This alternative would maintain the current status and distribution of habitat and over time habitat would improve due to increases in the larger snags and the increases in tree size. This alternative would continue to provide at least medium habitat capability over approximately 62% of the federal lands (CWHR 4M, 4D, 5M, 5D) within the project area (approximately 20,000 acres).

The HFQLG Pilot Project was developed in part to test whether certain landscape treatments are effective in reducing the effects of stand replacing fires (HFQLG FEIS 1999). If successful, the treatments would reduce the impact to suitable habitat for this species. To date, there have been no large fires on which to base the effectiveness of the treatment and since fires are not predictable in space or time, there is no basis on which to compare not implementing the project.

Cumulative Effects to the Pileated Woodpecker

Because this alternative provides no discernable effects, there are no cumulative effects that can be accurately portrayed.

Alternative 14

Direct and Indirect Effects to the Pileated Woodpecker

As noted in the effects discussion for Alternative 1, the treatments would maintain suitable foraging habitat that pileated woodpeckers would use and that the thinning, while possibly reducing foraging opportunities, does not preclude use. The snag retention guidelines would retain those attributes most utilized by this species, particularly as nesting substrates. The addition of Prescription E may improve localized use of areas due to the retention of pockets with higher densities. During marking snag retention is generally incorporated into the leave islands thereby increasing the value of nesting habitat for this species. There may

also be some local benefit to the reduction of group selections which generally do not favor this species. Other than as noted, the analysis for Alternative 1 would apply to this alternative as well.

Cumulative Effects to the Pileated Woodpecker

The cumulative effects due to implementing this alternative in conjunction with past actions (Appendix A, Tables 3-29 and 3-30) would be the same as Alternative 1. The changes provided through the addition of Prescription E are not sufficient to change the overall cumulative effects.

Peregrine Falcon

Affected Environment – Current Condition

The peregrine falcon serves as a MIS, representing cliff dwelling avian predators. The peregrine was removed from the Endangered Species List in 1999 and is currently under a federal monitoring program. The Eagle Rocks area (within the Creeks project area boundary) has a history of successful peregrine nesting. Several group selections are proposed approximately ¼ mile from the nest site. A limited operating period (LOP) during the period March 1 to August 31 would be applied to all activities within ½ mile of the active nest site. Habitat in the vicinity of the nest site and within the estimated territory would be treated by the Proposed Action.

There are seven peregrine nest sites within or adjacent to National Forest Lands on the Almanor Ranger District. The sites are routinely monitored; time permitting to determine activity including reproductive status. The limiting factor for peregrine appears to be nesting habitat and cover which is described as protected cliffs and ledges near water (Ziener et al. 1990). High and moderate habitat values are shown in Table 3-62.

Table 3-62. Selected habitat attributes for high and moderate habitat values (peregrine falcon)

Habitat Variable	High	Moderate
Food Supply	Abundant and available avian prey within 6 miles of nest site. Common prey species include: band-tailed pigeon, rock dove, mourning dove, common flicker, jays, starlings, robin, western meadowlark, acorn woodpeckers.	
Disturbance	No disturbance within 2 miles of nest site March 1 – May 15	Short-term disturbance within 1 mile of nest site March 1 – May 15.

Source: USDA Forest Service 1993a Appendix O-16

Prey species include band tail pigeon, rock dove, and mourning dove (Zeiner et al., 1990a), all of which are generally associated with more oak woodlands. The CWHR (Version 8) program indicates the larger sized trees (CWHR size class 4 and 5) provide better habitat than do younger stands, such as plantations, but all stands provide relatively high habitat value. The mourning dove is also positively associated with stands that have canopy densities less than 70%. Due to the paucity of oak within the project area and habitat associated with the primary prey, this project is unlikely to affect prey abundance. Peregrines are aerial hunters, normally catching prey in the air above tree canopies or over meadows. This species likely forages in more open habitats such as meadows and oak woodlands adjacent to the project area, or on private grounds within the project area.

Environmental Effects

Alternative 1 - Proposed Action

Direct and Indirect Effects to the Peregrine Falcon

Given that the project would not affect the nesting habitat (rock bluffs) and that limited operating periods would be used to limit disturbance during nesting, there would be no predictable direct impact to the species. The project may have limited impacts to prey species although overall, habitat value would marginally improve for prey, primarily due to edge creation within the group selections. There may be some disturbance during project implementation for foraging falcons. However, as previously stated, foraging habitat is very limited within the project units and foraging likely occurs away from area of implementation.

The model for this species requires not disturbance within 2 miles of the nest between March 1 and May 15 for high quality habitat. In most years, snow cover prohibits access to within the 2 mile radius therefore the criteria for high quality habitat with regard to disturbance would be met.

Cumulative Effects to the Peregrine Falcon

The cumulative effects for this species include the project area. Habitat attributes for peregrine are fairly broad and do not generally include forest habitats therefore the past treatments (Table 3-29) have likely had little impact on foraging but peregrines may forage in extremely open stands (SSS, HCC). However they most likely forage in the adjacent oak areas and meadows on private, where habitat for the preferred prey species is more abundant.

The majority of nests are in areas where management activities as unlikely due to administrative designations, topography or other resource reasons. Where the potential for disturbance does exist due to management activities, limited operating periods are applied. One project utilizing roads within the ½ mile territory occurred in 1999. LOPs were applied until fledging occurred and nesting has resumed since that time. Because there would be neither adverse impact to this species habitat nor direct or indirect impacts to the nest site associated with the project, there are no predictable cumulative effects.

Alternative 2 - No Action

Direct and Indirect Effects to the Peregrine Falcon

Peregrines forage in open habitat or above the canopy (as opposed to forest adapted hunters such as the goshawk). Not surprisingly, the majority of prey species are associated with either early successional habitat or more open habitats. This alternative would continue the trend of declining forage habitat due to increased stand densities. Because stand densities within the project area have been fairly high for at least one decade, with no perceptible impact, it is unlikely that this alternative would further impact foraging opportunities within the project area.

This alternative would have no affect on the existing nesting habitat.

Cumulative Effects to the Peregrine Falcon

Current direction favors the development of dense mature stands. Past actions have generally resulted in more open stands but the canopies are generally at levels that preclude foraging suitability. Private operations have had similar impacts, although canopies have been lowered, they remain at levels that preclude foraging. Several ongoing meadow enhancement projects have likely improved foraging immediately adjacent to the project area on private grounds.

Alternative 14

Direct and Indirect Effects to the Peregrine Falcon

As described in Alternative 1, thinning stands is unlikely to have a measurable impact on peregrine behavior within the project area. As this alternative provides the same impacts to the species as Alternative 1, the direct and indirect effects analysis for Alternative 1 is applicable to this alternative.

Direct and Indirect Effects to the Peregrine Falcon

As this alternative provides the same impacts to the species as Alternative 1, the cumulative effects analysis for Alternative 1 is applicable to this alternative.

Migratory Landbirds

Affected Environment

Migratory bird species have come to the forefront in recent years due to population declines in a relatively high number of species in this group. Current research has indicated that loss of breeding habitat rather than declines in wintering grounds are contributing to declining population trends (Burnett personal communication, 2005). The Region has developed a number of partnerships with various programs including Partners in Flight (PIF), and considers migratory birds a group that should receive consideration during project planning although there is no current formal direction for these species. Because forestlands provide a substantial portion of breeding habitat, land management activities within the Lassen National Forest can have an impact on local populations. This portion of the analysis considers data developed from several years of monitoring locally important habitats.

The SNEP (1996) report summed the CWHR values for Sierran birds with declining populations. While declines were noted for a broad range of species utilizing a number of habitats, species showing the greatest decline were those that utilized more open stands in smaller size classes (CWHR 3P and 4P). However, many of these species are associated with shrubs as well, an attribute that is not represented in the CWHR value. There is no population data for declining species locally but actions that increase the acres of open stands (stands with less than 40% cover) and retain or enhance shrubs would benefit most declining species.

The Almanor Ranger District initiated migratory land bird monitoring in 1997. At that time, monitoring centered primarily on meadows and shrub fields. In 2002 the program was expanded to include the monitoring of actions that might be taken under the HFQLG FEIS (1999), as outlined in the Monitoring Plan. To that end, monitoring plots were set up in the Creeks Project area and data has been collected annually. The data collected for the Creeks Project monitoring has been included in the Plumas-Lassen Administrative Study (PLAS) as well. In that study, the pre-treatment data shows that the treatment areas within the Creeks Project have one of the highest species richness within the PLAS study units. Species richness is defined as the mean number of species detected within 50 meters of each point, averaged across visits. The long-term monitoring has highlighted the difficulty in assessing trends. The statistics show a highly variable trend in species richness and diversity for each site monitored indicating that trend data may only be valid after many years of monitoring.

The Almanor Ranger District supports populations of many species that have been identified as declining within the Sierra Nevada range, including Swainson's thrush, willow flycatcher, olive-sided flycatcher and the yellow (Audubon's) warbler (Burnett and Humple, 2003). The Almanor Ranger District is home to 9 of 14 riparian focal species and at least 12 of the 13 coniferous forest focal species as identified by California Partners in Flight (Burnett and Humple, 2003).

The data strongly indicates that riparian habitats (meadow and riparian hardwood complexes) provide the highest species diversity and richness. The monitoring also shows that a number of species are positively correlated to shrub cover and negatively correlated to conifers. However, the opposite is also true. Table 3-63 provides a brief list of several species common to the project area and habitat correlations (Burnett and Humple, 2003 pgs 10 and 11).

Table 3-63. Summary table for habitat attributes for 12 migratory landbird species on the Almanor Ranger District[1]

Species	Variable	Correlation (+/-)
Olive Sided Flycatcher	Tree Cover	-
	Shrubs	+
Dusky Flycatcher	Tree	-
	Shrubs	+
Hammonds Flycatcher	Shrub Species Richness	-
	Tree Cover (White Fir)	+
Brown Creeper	Shrub Cover	-
	Tree Species Richness	+
Red-Breasted Nuthatch	Shrub Cover	-
	Black Oak	-
	Snags	+
Hermit Thrush	Tree Cover (White Fir)	+
Nashville Warbler	Shrub Richness	+
	Tree Species Richness	+
	Black Oak	+
Hermit Warbler	Tree Species Richness	+
	Max Tree Height/dbh	+
MacGillivrays Warbler	Tree Cover	-
	Shrub Richness	+
Oregon Junco	Lodgepole Pine	+
Fox Sparrow	Shrub Cover	+
	Tree Cover	-
Western Tanager	Shrub Cover	-
	Tree Cover	+

Source: Burnett and Humple 2003

[1]A complete review of the monitoring report is needed to fully understand the data presented.

Interestingly enough, monitoring also showed that fires (such as the Storrie Fire) result in a flush of abundance and species richness immediately after the fire followed by declines after two to three years. Burnett (personal communication, 2005) speculated this is due to a short-term increase in insects in conjunction with high site fidelity.

The ten most abundant species found in the treatment areas were mountain chickadee, Audubon's warbler, hermit warbler, dusky flycatcher, golden-crowned kinglet, Hammond's flycatcher, red-breasted nuthatch, Oregon junco, western tanager, and brown creeper (Burnett et al., 2004). This group has a wide range of habitat needs indicating the project area in general, and treatment area in particular, supports a highly diverse population.

Environmental Effects

Alternative 1 - Proposed Action

Direct and Indirect Effects to Migratory Landbirds

Based on the data presented in Table 3-63 and songbird monitoring data, the project is not likely to have a measurable long-term affect on migratory bird species. However, it is likely local populations would initially decline within the treatment area. While several species are positively correlated to conifers, few are positively correlated with dense canopies and large (>24 inches dbh) conifers. The temporary reduction of shrubs would pose a risk to individual reproduction due to loss of nesting sites, but the acres of shrubs affected are a very small component of the project therefore the risk is low for shrub-adapted species.

Since meadow and riparian habitats would remain largely unaffected, the impact to the majority of species and individuals would be largely avoided.

As mentioned in the vegetation section of this report and as indicated in Table 3-63, the edge habitat created through the implementation of group selections would increase landscape heterogeneity. Rodewald and Brittingham (2002) found that migrating birds used structurally heterogeneous habitats more than homogenous pole stage forests (even-aged stands less than 30 years of age). Forest edges (the ecotone of shrub, riparian, and forest communities) were preferentially selected and provided high quality stop-over habitat for migrating landbirds. Species richness was higher in the edge dominated habitats than in other habitat types. Local data suggests that edge habitats, particularly those associated with riparian habitats, have higher species abundance and richness (PRBO 2004).

The risk to migratory birds is high during implementation. While most activities would not likely occur prior to June 1 of any given year, nesting may last until August and therefore nests within the treated area are likely to be lost. The impact is not measurable due the high degree of annual fluctuation in nesting. The long-term effect would be positive for species that prefer edge habitats. There is likely to be a decrease in species that prefer dense canopied forest habitat however, the overall effect is likely to be a slight increase for species richness within the project area.

Cumulative Effects to Migratory Landbirds

The area of cumulative effects for this group of birds is the project area. Tables 3-29 and 3-30 provide an outline of effects to habitat that is applicable to the broad raft of species included in this group. No doubt species that preferred early successional habitat benefited from past activities. Species that prefer shrub habitat also likely benefited as shrub habitats likely increased. Conversely species preferring closed canopies likely declined in numbers. Overall, species diversity likely increased while species richness may have declined somewhat. Most recently TFA and TFB did little to improve intra-stand diversity and therefore were likely to benefit the fewest species. The addition of group selections to the landscape would retain an early successional composition to the landscape that has slowly declined over time.

There are few, if any, measurable cumulative effects due to anticipated future actions. Projects such as the proposed Willow Forest Health Recovery Project and the Browns Ravine Oak Enhancement project may add additional changes to shrub and coniferous forest stands which in turn may be additive to the overall landscape changes and a greater amount of heterogeneity. Smaller projects such as the Jonesville project provide very localized impacts and likely have very little, if any impact, at the Forest level.

Because this suite of species is broad and the species utilize a wide range of habitats, the impact is difficult to quantify and describe. The number of individuals that prefer late successional habitats and multiple canopies would likely decline in numbers but would still find sufficient habitat throughout the District and Forest so that they are not precluded. The implementation of group selections across the landscape (Creeks FHRP and

Willow FHRP) would benefit species that prefer shrub and edge habitats and increase their presence on the Forest.

Alternative 2 - No Action

Direct and Indirect Effects to Migratory Landbirds

This alternative would continue the trend of denser canopied stands with a decline in understory vegetation that is preferred by most species, particularly those in decline. Habitats that would be most adversely impacted by this alternative are the edges and riparian communities where species richness and diversity is highest. Few of the declining species that breed within Sierran mixed conifer habitat, and are currently experiencing downward trends, would benefit from this alternative.

The HFQLG Pilot Project was developed in part to test whether certain landscape treatments are effective in reducing the effects of stand replacing fires (HFQLG FEIS 1999). If successful, the treatments would reduce the impact to suitable habitat for this species. To date, there have been no large fires on which to base the effectiveness of the treatment and since fires are not predictable in space or time, there is no basis on which to compare not implementing the project.

Cumulative Effects to Migratory Landbirds

As the No Action alternative would continue a trend towards denser conifer (particularly fir) communities with a declining shrub understory and reductions of edges, there are no predictable effects that would cumulatively add to this condition. Most actions (such as management activities, fire, drought, and insect infestations) favor reductions in the number of conifer stems/acre and an overall reduced basal area.

Alternative 14

Direct and Indirect Effects to Migratory Landbirds

This alternative provides essentially the same effects as Alternative 1 except for the additions of untreated areas within Prescription E. This would provide very localized improvements for species that prefer denser stands for nesting. The reduction in the number of group selections is not expected to have measurable affects, positive or negative due to the groups elsewhere in the project area.

Cumulative Effects to Migratory Landbirds

The cumulative effects for this alternative would be essentially the same as for Alternative 1.

Watershed / Fisheries / Soils

The Creeks project area is located at the transition between the Sierra Nevada and Cascade Mountain ranges. Elevations range from about 4,300 feet to approximately 7,000 feet. Annual precipitation ranges from 37 inches at Chester to 80 inches at higher elevations. Most of the precipitation comes as snow rather than rain, though warm rainstorms do occur each year. Annual snow depths range from three to five-feet at Chester, while at the higher elevations greater depths are common.

Topography in the project area is gently sloping terrain to steep mountainous landforms. Soils are derived mostly from weathered volcanic parent rock with some derived from weathered granitic, metavolcanics and metasediments. There are a high percentage of surface rocks. Depth to bedrock varies widely from less than 20 inches to over 60 inches; the majority of soils are 30 to 40 inches deep.

The Creeks Project area is located on portions of ten subwatersheds (Figure 3-18) that feed Yellow Creek and the North Fork Feather River, ultimately draining into the Sacramento River. The majority of the subwatersheds are public land managed by the Forest Service, although there is substantial private land. Most of these private lands are managed for timber production (Figure 3-19).

Field Surveys/Resource Contacts

Soil and hydrology fieldwork methods and analysis methodologies were coordinated through the Almanor Ranger District Hydrologist. Information on current water quality guidelines and stream segment status was collected from the Environmental Protection Agency, California Regional Water Quality Control Board, and from local data collected on the Lassen National Forest.

The most recent on-site field surveys were made during June, August, and October of 2004. These were conducted to determine current condition of the watershed and soil resources and to evaluate the potential effects of proposed vegetation management activities. They supplement amphibian surveys conducted from 1993 through the present, and stream habitat inventories conducted on perennial streams in 1997, 2001 to 2003 (Tables 3-46 and 3-47). Additional assessments of stream and meadow condition conducted by range specialists are discussed in the range management section of this document.

Best Management Practices

The regulatory framework guiding this analysis is provided by the 1993 LNF LRMP as amended. All project subwatersheds are managed through standards and guidelines defined in Appendix L of the 1999 HFQLG FEIS (also known as SAT guidelines). Further direction is provided by Region 5 Soil Quality Standards (USDA FS, 1995) and Region 5 Best Management Practices (USDA FS, 2000a).

The State and Regional Water Quality Control Boards entered into agreements with the U.S. Forest Service to control nonpoint source discharges by implementing control actions certified by the State Water Quality Control Board and the EPA as best management practices (BMPs). BMPs are designed to protect and maintain water quality and prevent adverse effects to beneficial uses both on-site and downstream. In addition, the land disturbing activities would be dispersed in time and space so that the subwatersheds would not reach or exceed the threshold of concern for overall watershed disturbance. A complete list of applicable BMPs for this project can be found in Appendix E.

Beneficial Uses and Impaired Waterbodies

Beneficial uses for the watersheds contained in the project area include a) power generation, b) agriculture (irrigation and stock watering), c) freshwater habitat (warm and cold), d) migration (cold), e) spawning (warm and cold), f) wildlife habitat, and g) recreation (contact and noncontact). No municipal watersheds would be affected by this project. There are no 303d listed waterbodies within the project area and there are no listed segments downstream that could be impacted by this project.

Soils

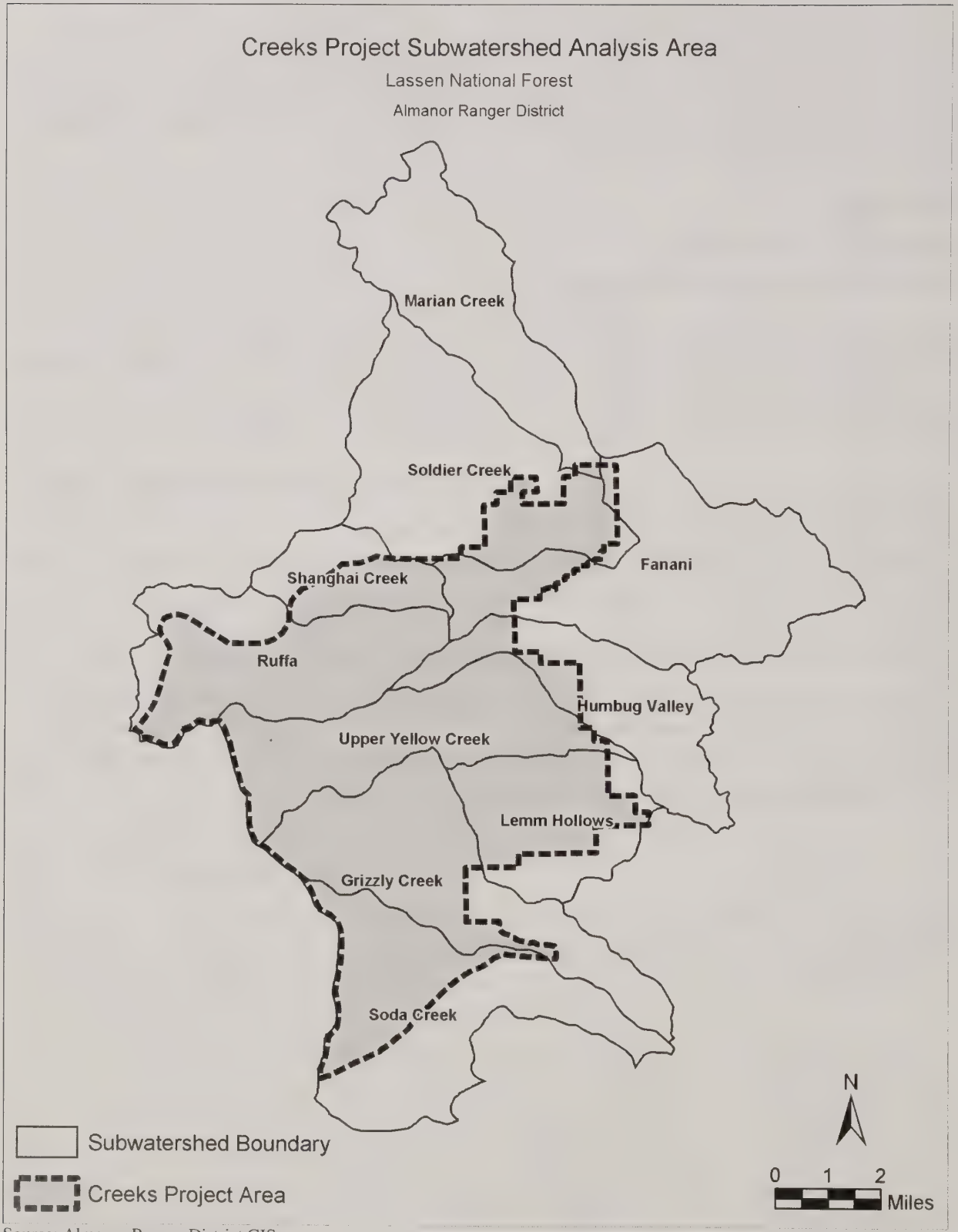
Affected Environment

Soil Type and Soil Erosion Hazard

The soils in the project area are derived from both volcanic and granitic sources, the volcanics being primarily basalts and andesites. Soil types range from fine sandy loam to gravely sandy loam with many rock fragments. The more recent volcanics tend to have thin soils with areas of deeper soils interspersed among the rock outcrops. Overall, most soils in the project area have a low to medium erosion potential (Table 3-64, Figure 3-20).

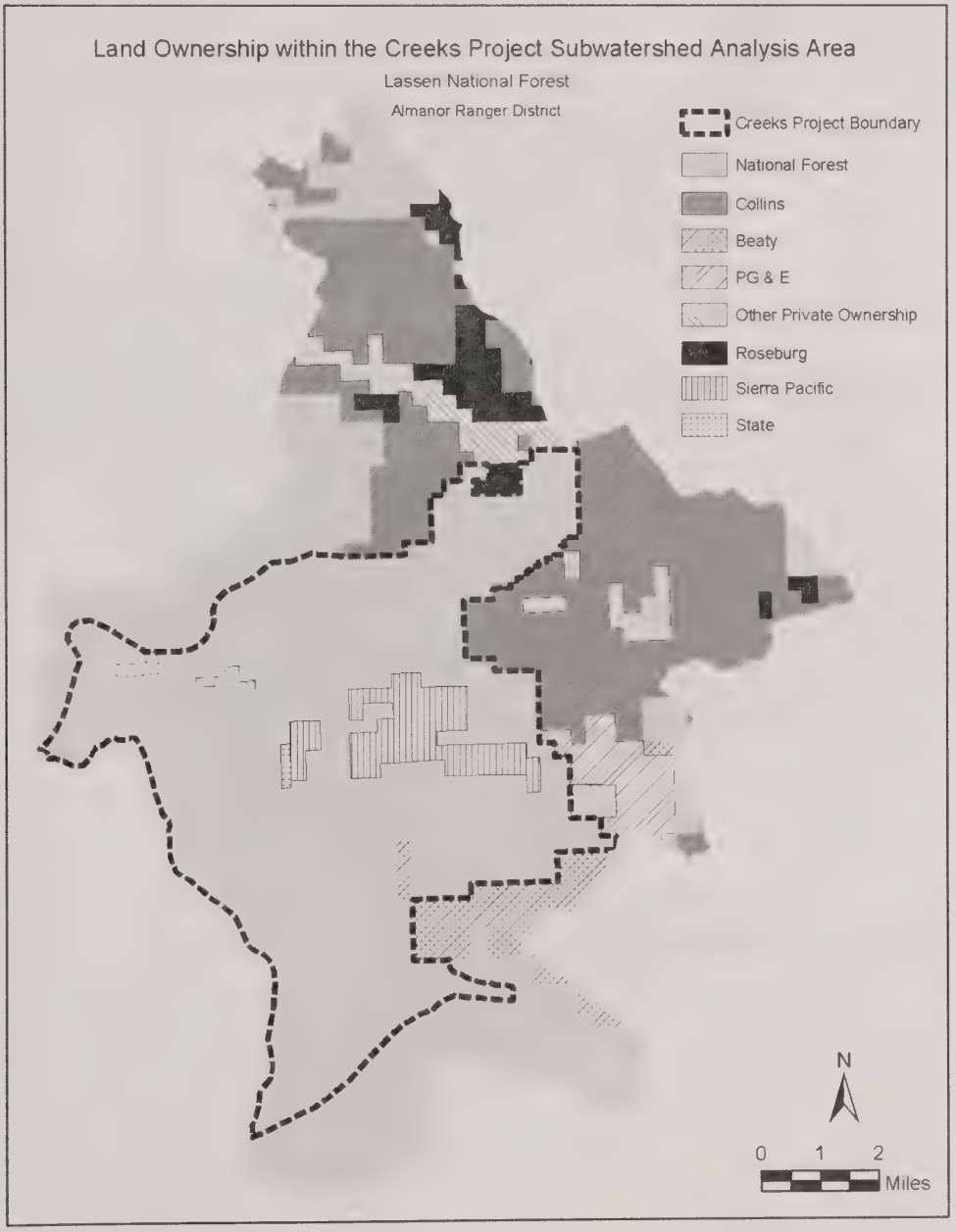
Soil erosion hazard in the project area is displayed (Figure 3-10) using an Erosion Hazard Rating as an indication for risk of accelerated sheet and rill erosion from land management activities. A "Low" hazard rating is applied where soil disturbance is not likely to cause accelerated soil erosion. A "Medium" hazard is applied to areas where soil disturbance would likely cause accelerated soil erosion during years with normal precipitation. Soils with this hazard rating are susceptible to reductions in soil productivity when activities remove ground cover, especially at the higher end of the "Medium" erosion hazard rating range. "High" hazard ratings are applied when soils are likely to erode during most years, with or without disturbance. No soils with high erosion hazard ratings would be affected by project activities. These soils occur on less than 3% of the total project area. Although this information is presented as part of the Affected Environment, it is not carried forward into the effect analysis.

Figure 3-18. Creeks Project Subwatershed Analysis Area



Source: Almanor Ranger District GIS

Figure 3-19. Land Ownership within the Creeks Project Subwatershed Analysis Area



Source: Almanor Ranger District GIS

Table 3-64. Soil types and erosion hazard within the Creeks Project area.

Soil Mapping Unit (SMU)	Acres of SMU in Planning Area	Percent in < 35% Slope Class	Percent in 35 to 65% Slope Class	Percent in > 65% Slope Class	Soil Types in SMU	Percent of SMU	Max Erosion Hazard
3	0.8	100.0%	0.0%	0.0%	Aquolls	80	low
23	1245.0	9.2%	89.8%	1.0%	Holland	90	low
24	21.7	95.1%	4.9%	0.0%	Holland	60	low
					Skalan	30	low
25	407.0	25.9%	73.9%	0.2%	Holland	50	moderate
					Skalan	40	moderate
28	343.8	4.0%	93.8%	2.2%	Holland metased	50	moderate
					Skalan	30	moderate
29	0.5	4.2%	95.8%	0.0%	Holland metased	45	high
					Skalan	40	moderate to high
36	1224.6	90.4%	3.6%	6.0%	Inville	45	moderate
					Wintoner	40	moderate
59	47.3	40.1%	44.9%	15.0%	Lithic Xerumbrepts	50	moderate
					Rock	20	N/A
					Rubble	20	N/A
74	15.6	79.2%	19.8%	1.0%	Rock	60	N/A
					Rubble	30	N/A
79	873.3	99.7%	0.3%	0.0%	Sheld	100	moderate
81	71.3	94.1%	5.2%	0.7%	Sheld	40	moderate
					Innville	20	low
					Sheld mod. Deep	20	moderate
84	168.0	99.2%	0.8%	0.0%	Sheld mod. Deep	60	moderate
					lithic Xerumbrepts	20	moderate
85	38.8	50.4%	44.9%	4.7%	Sheld mod. Deep	55	moderate to high
					lithic Xerumbrepts	25	moderate
91	202.5	92.5%	7.5%	0.0%	Sheld mod. Deep	45	moderate
					Sheld	25	moderate
					Rock	20	N/A
96	348.0	2.6%	93.4%	4.0%	Skalan mod deep	50	moderate to high
					Deadwood	30	moderate
98	460.4	17.2%	78.7%	4.1%	Skalan	60	moderate
					Holland	30	moderate
131	704.8	90.1%	6.8%	3.1%	Yallani	50	moderate
					Sheld mod. deep	35	moderate to high

Source: From Soil Survey of Lassen National Forest Area (USDA FS, 1994).

Figure 3-20. Erosion Hazard Rating within the Creeks Project Area



Source: Almanor Ranger District GIS

Soil Properties

The soils in the project area are generally loamy to coarse loams (moderately coarse to medium textured). Infiltration is high and runoff is low (Table 3-65) to moderate in most of these soil groups. Surface erosion is uncommon under vegetative cover. Although this information is presented as part of the Affected Environment, it is not carried forward into the effect analysis.

Table 3-65. Properties of soils located within the Creeks Project area.

Soil Types	Runoff
Aquolls	very slow
Deadwood	moderate-rapid
Holland	slow
Holland metadsedimentary	slow
Inville	slow
Lithic Xerumbrepts	moderate
Rock	n/a
Sheld	slow
Sheld glacial	slow
Sheld mod deep	slow
Skalan	moderate
Skalan mod deep	slow
Wintoner	slow
Yallani	moderate-rapid

Source: From Soil Survey of Lassen National Forest Area (USDA FS, 1994).

The Region 5 Soil Quality Standards (USDA FS, 1990) address 3 areas of soil function for project level activities: soil productivity, soil hydrologic function, and soil buffering capacity. The soil quality standards for these processes are as follows:

Soil Productivity

- Soil Porosity should not exceed a 10 percent reduction in total soil porosity. Soil Porosity is an indicator of compaction.
- Organic matter is maintained in amounts sufficient to prevent substantial short term or long-term nutrient cycle deficits, and to avoid detrimental physical and biological soil conditions.
- Soil organic matter in the upper 12 inches of soil is at least 85 percent of the total soil organic matter found under natural conditions for the same or similar soils. Surface organic material is present in the following amounts:
  - Fine organic matter (cover) occurs over at least 50 percent of the area. Fine organic matter includes plant litter, duff, and woody material less than 3 inches in diameter. The dry weight of fine organic matter without woody material is about 0.2 to 3 tons per acre.
  - Large woody material is at least 5 well-distributed logs per acre representing the range of decomposition classes. To alleviate the risk of adverse fire effects, dry weight should be less than about 3 tons per acre.
  - Desired logs are at least 20 inches in diameter and 10 feet long. Protect logs in decomposition classes 3 through 5 from mechanical disturbance. Do not count logs less than 12 inches in diameter or stumps as large woody material.

- Fine organic matter and large woody material together should amount to less than about 6 tons per acre dry weight to alleviate the risk of potential detrimental wildfire effects. Other surface organic matter (3 inches to 20 inches in diameter), or amounts of fine organic matter and large woody material in excess of amounts described in detail above need not be retained.

- Soil Moisture Regime is unchanged where productivity or potential natural plant community is dependent upon specific soil drainage classes. Natural soil drainage classes are used to evaluate the effect of management induced water table or subsurface flow changes on plant growth or potential plant community composition.

Soil Hydrologic Function

- To avoid accelerated surface runoff, infiltration and permeability are not reduced to ratings of 6 or 8 as defined in Region 5 Erosion Hazard Rating system (R-5 FSH 2509.22, Ch. 50).

Soil Buffering Capacity

- Materials added to the soil must not alter soil reaction class, buffering or exchange capacities, or microorganism populations to the degree that significantly affects soil productivity, bioremediation potential, soil hydrologic function, or the health of humans or animals.

Existing Condition of Soils

The soil productivity attributes assessed in activity areas are compaction, soil cover, and organic matter conditions. Data was gathered from previous surveys conducted in the area and from field evaluations where conditions were qualitatively assessed through random sampling. The majority of areas examined appear to have soils that are functioning at or near their productive capacity. The rate of soil loss on activity areas currently meets Soil Quality Standards. Cover was above 50% on all activity areas surveyed. Areas burned at high intensity by the Storrie Fire are showing increases in ground cover and should be back to pre-fire ground cover levels in a few years. Large areas of accelerated soil erosion (greater than 1/10th of an acre) were not encountered during surveys in unburned areas.

The project area was stratified into activity areas where recent past management activities (soil disturbance) have occurred and where proposed project activities are planned. A field survey of the project area was conducted in September of 2004 to assess the current condition of the soil resource. Some areas disturbed by past treatments show evidence of compaction on skid trails. These treatments included tractor-thinning activities that took place in the early 1980's. Field evaluations revealed no other indications of lasting impacts to soil productivity. Soil compaction on all activity units surveyed was less than 10%.

The continuing recruitment of organic material is critical to the long-term health of soils and therefore to future forests. Graham et al. (1999) writes: "Larger fuels consisting of standing dead trees, large limbs, and down logs or coarse woody debris play critical roles in fixing and storing nitrogen (N), protecting the soil surface, and supplying organic matter to the forest floor."

Coarse woody debris (CWD) (dead organic material 3 inches in diameter and larger) is also important in terms of its ability to act as a reservoir or sponge for water storage at the soil surface, its effect on stream channel stability, and also for its usefulness as habitat for some wildlife species. CWD and large woody material (LWM) (a subset of CWD) includes snags and downed organic material 12 inches in diameter and larger. Recent pre-project monitoring conducted by the Forest Service within the HFQLG Pilot Project area

suggests that some areas may not currently be meeting the goal of 5 logs per acre of LWM while others greatly exceed it. Therefore where LWM is lacking, adherence to wildlife snag standards and maintaining current levels of CWD is important.

Environmental Effects

Alternatives 1 and 14 -

Direct/Indirect and Cumulative Effects to Soils

Those activities associated with the removal of timber and materials from the forest using mechanized equipment have potential to disturb soil and produce prolonged impacts to the soil resource. Direct impacts to soil quality parameters and sediment delivery to stream channels are the main watershed resource concern related to this project. Most project activity sites have been previously harvested so project effects are added to existing disturbance. In most cases, additional disturbance is minimized by using existing skidtrails and landings. Likely foreseeable actions include timber harvest and fuels treatments. Soil conditions at the time of those activities would guide prescriptions and soil protection standards, so this evaluation is limited to the cumulative result of past, current and project proposed effects on project area soils. The non-mechanical activities (broadcast burning, hand piling) are not expected to have any adverse effects to the soil or water resource.

The project area has gentle to moderately steep hillslopes. No project activities would occur on highly erosive soils. Review of past harvest activities indicate that soils recover from moderate ground disturbing activities, but do so at slower rates at higher (5,500 ft) elevations. The effects of prescribed fire and other fuels reduction activities, and the effects of any non-mechanical harvest activities are expected to recover fairly rapidly (3 to 10 years). All other activities, including mechanical harvest and temporary road building are expected to recover within 5 to 20 years.

Soil Productivity

The risk of negatively affecting soil productivity is low for the proposed project activities. The project would be implemented with integrated design features designed to avoid or reduce the potential negative effects of the proposed activities on soil resources (Integrated Design Features, Chapter 2). By limiting and designating the number of skid trails and limiting operations to periods when soils are dry, soil compaction would not exceed 10 percent of any activity area. Existing compaction would be reduced by decommissioning all temporary roads (many are existing unclassified roads) utilized during timber harvest following project activities. Soil organics would be maintained by leaving five well-spaced logs (12 inches diameter or greater) per acre of activity area. Portions of activity areas, which do not initially meet ground cover requirements due to project activities, would be mulched and slashed to meet 60 percent ground cover.

Soil Hydrologic Function

The risk of negatively affecting soil hydrologic function is low (with the exception of the Grizzly Creek subwatershed). Based on a combination of field surveys and estimates of cumulative disturbance using equivalent roaded acres (ERA), soil quality guidelines for Soil Hydrologic Function are being met in all project subwatersheds. It is estimated that Detrimental Soil Disturbance for Soil Hydrologic Function is below 10% in all subwatersheds.

Risk of disturbance to soil hydrologic function was estimated using the Region 5 Equivalent Roaded Acres model, which assesses past, present and foreseeable actions. (see cumulative watershed effects section for description of this method). Ground disturbing activities such as tractor yarding and temporary road building all rate as having high potential for disturbance to hydrologic soil function, whereas helicopter yarding and non-mechanical activities all rate as low risk. The results of the ERA modeling indicate that Grizzly Creek may be close to its threshold for disturbance to hydrologic soil function (Table 3-72). Hydrologic function is measured at the scale of activity units (locations where ground disturbance will occur). The ERA method includes disturbance from roads (road densities in Grizzly Creek are high) and from private land. Accounting for these factors, it is reasonable to assume the 10% objective would be met in activity areas within the Grizzly Creek sub-watershed, and other project sub-watersheds.

In order to meet the soil organic recommendations, 10 to 15 tons/acre of Large Woody Material (LWM) would be left on all activity areas. It is unknown what portion of Coarse Woody Debris (CWD) (all surface fuels 3 inches in diameter and greater) was historically attributable to LWM. The recommended range of LWM pieces for long term soil productivity is five well distributed logs per acre representing a range of decomposition classes. Maintaining this will recycle nutrients into the soil horizon and provides a microclimate for moisture retention and suitable habitat for soil organisms.

It is not expected that the non-mechanical thinning and fuel reduction activities would have lasting impacts on the soil resources. Most of these activities are handwork and would not pose a substantial risk for soil disturbance and decreases in soil productivity. Additionally, the immediate incorporation of extra coarse woody debris from thinning activities would be a near-term benefit in terms of adding hydrologic roughness to the hillslope to reduce erosion and reincorporate organic material into the soil surface. Ground based logging activities have the potential to cause soil displacement, compaction, rutting, and accelerated soil erosion. The application of soil and water conservation Best Management Practices (BMPs) would further minimize the extent of these impacts to soils (USDA FS, 2000a).

Soil Buffering Capacity

Soil buffering capacity would be maintained through the implementation of the ground cover and CWD recommendations.

Alternative 2 - No Action

Slight upward trends in porosity and soil hydrologic function would occur as soils recover from past disturbance. Because historic sites of disturbance currently meet soil quality standards, this is characterized as a minor benefit to soil quality. Unless wildfires of high severity were to occur, ground cover and rates of erosion would likely remain unchanged. Recovery in porosity and hydrologic function would be offset to some degree by likely changes in coarse woody debris. In the short term (0 to 10 Years), CWD would be maintained at or near its current levels. A near term (10 to 30 year) CWD surplus would be expected in many areas as trees die from overcrowding and endemic insects and disease.

Watershed and Aquatic Resources

The project proposal includes mechanical and hand removal of vegetation, with associated transport of materials as well as prescribed fire and road construction, decommissioning and maintenance. Extensive research has been conducted on the effect of these types of activities on water quality and stream habitats (Chamberlin, Harr and Everest, 1991). Research findings indicate that aside from areas with potential for mass wasting, the primary effects on water quality and aquatic habitats result from increases in sediment and temperature, and a loss of hydrologic and biological connectivity due to construction of channel road crossings. Changes to these processes are emphasized in this section. Also discussed are effects on water yield, floodplains and wetlands, and sensitive and management indicator species,

Affected Environment

Project area subwatersheds support both perennial and seasonally flowing streams (Table 3-66 and Figure 3-21).

Table 3-66. Creeks Project Area Stream Miles by Stream Type

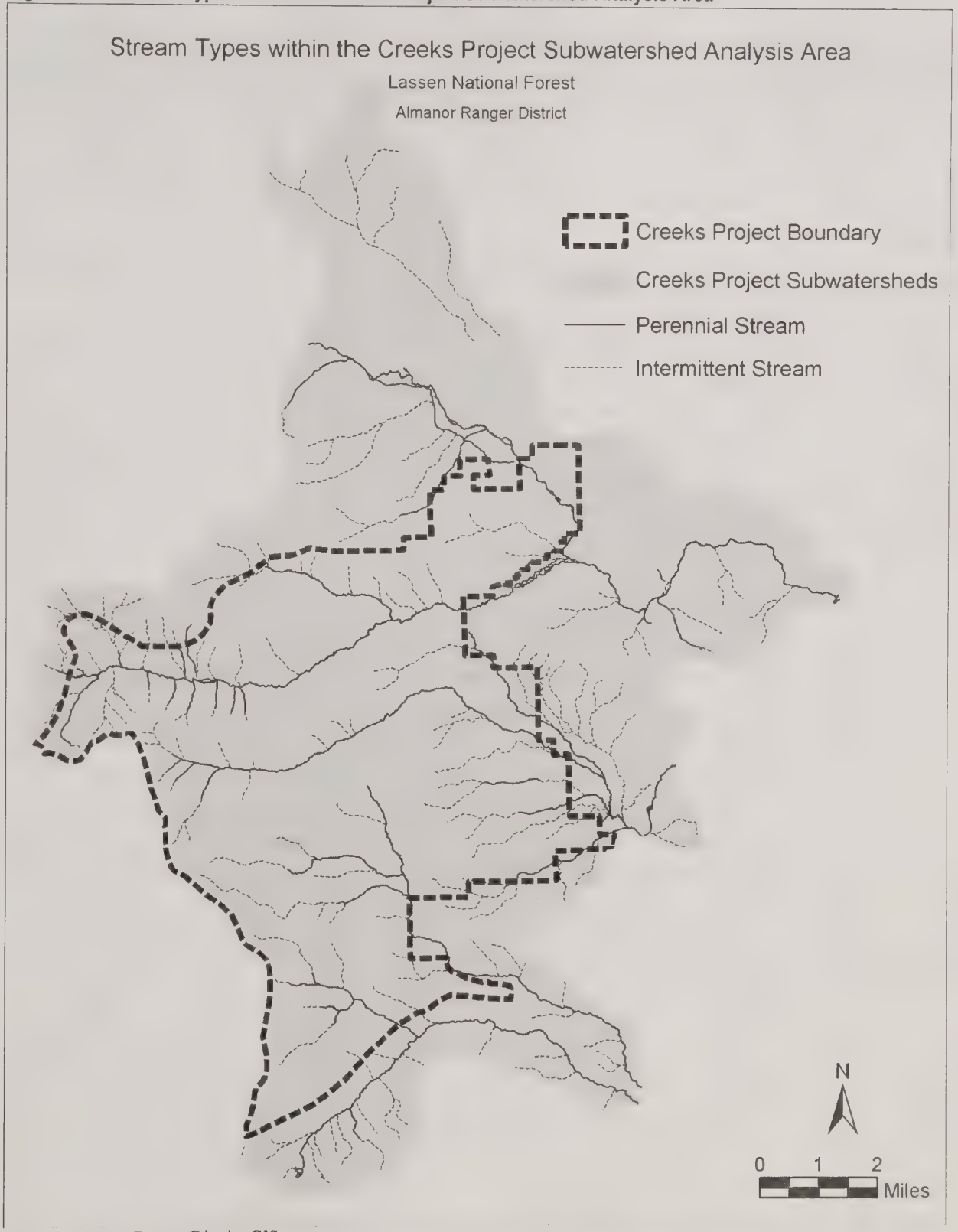
Stream Type	Stream Miles
Seasonally Flowing	950
Perennial	781

Source: Almanor Ranger District GIS

Sediment

Data from stream inventories (see Tables 3-67 and 3-68) indicate that Butt and Water Creeks have the highest percentage of sediment in pool tails (pool tail fines). Butt Creek is a low gradient meadow type channel and would be expected to have higher fine sediment deposition than in steeper, confined channels. Butt Creek is also the site of historic grazing activity that has led to past channel instability, though Stream Condition Inventory (SCI) data shows an increase in stability between 2002 and 2004). This is reflected in both the in-stream sediment and channel stability values. Most of Water Creek was dry during the time of survey. The one reach with flowing water had fairly high percentages of fine sediment in pool tails, which may be attributable partially to effects of the Storrie Fire. The only other channel reaches showing a value greater than 15% surface fines is Grizzly Creek (reaches 1 and 2). These reaches were also burned and affected by the Storrie Fire (data collected in 2002, two years following the fire).

Figure 3-21. Stream Types within the Creeks Project Subwatershed Analysis Area



Source: Almanor Ranger District GIS

Table 3-67. Stream Condition Inventory (SCI) Data from Creeks Project Area

Stream	Year	% Gradient	Width to Depth Ratio	Entrench-ment Ratio	% Fine Sediment	LWD	# Pools	Residual Pool Depth	% Shade	% Un-stable
Butt Creek	2004	1.5	25.5	1	3.4	117	18	0.5	36.9	3%
	2002	1.2	30	1.7	3.1	141	18	0.5	28.9	23%
Yellow Creek	2002	1.4	34.5	1.3	9.6	113	20	0.4	11.2	35%
Shanghai Creek	2004	12.6	14.7	2.5	8.8	100	34	0.4	65.7	19%

Source: Data summarized from surveys conducted in 2002-2004
LWD: large woody debris. Residual Pool Depth: maximum pool depth minus pool tail depth

Impacts to water quality on Forest Service managed lands are associated with effects of the Storrie Fire and sediment delivery at stream crossings and from roads located near streams. The watersheds affected by the Storrie Fire within this analysis area are Grizzly Creek, Soda Creek, and Lemm Hollow. Percentage of these subwatersheds in the moderate to high burn intensity class ranges between 3.4 and 11.6 percent, with Grizzly Creek being the highest. Sediment delivery from roads and harvest areas on private lands is also occurring in many of the watersheds with private land ownership. Although the fire and subsequent harvest within these subwatersheds likely increased sediment concentrations, the channels are generally in good condition and recovery is occurring.

Reach: channel sample unit, characterized by channel type and gradient. G=good (recruitable trees >20"dbh present, lean over channel and/or >5% are snags; F=fair (recruitable trees >20" dbh, but do not exceed height >bankfull width and/or do not lean over channel; no ratings or poor(no recruitble trees .20"dbh)

Of the 229 miles of roads within the project area, there are 38 miles of road within RHCAs. Most of the 38 miles are road/stream crossings and road approaches to crossings rather than road segments paralleling streams within RHCAs. GIS estimates there are approximately 179 road crossings (Table 3-71 and Figure 3-22). Sediment delivery at these sites is caused from road drainage features such as inboard road ditches and from crossing fill eroding into stream channels. The majority of sediment delivery appears to be coming from road surface and road fill slope materials that are detached and transported to the channel after heavy road use, wet season road use, or precipitation events of great enough intensity to produce runoff. Graveled road segments appear to be delivering less sediment, but the gravel surface on many of these segments is thinning and may be losing its effectiveness in reducing sediment delivery.

Table 3-68. Stream Inventory Data from Creeks Project Area

Stream	Year	Reach	Length (m)	# LWD /100m	LWD Recruitment	# Pools /100m	Residual Pool Depth (m)	Percent Fine Sediment	Percent Shade
Shanghai Creek	2001	1	1700	7.8	41% G 59% F	3.2	0.38	8.00	68.3
		2	800	14.8	71% G 29% F	6.1	0.36	18.7	70
		3	700	17.6	86% G 14% F	2.1	0.26	4.7	70.9
Water Creek	2001	1	1100	10.3	46% G 36% F	4.7	0.3	38.8	55.6
		2	1200	7.5	25% G 75% F	0	n/a	n/a	77.4
		3	500	4.6	0% G 100% F	0	n/a	n/a	59.8
		4	1000	5.3	10% G 90% F	0	n/a	n/a	73.9
Mudhole Hollow	2001	1	400	0.5	0% G 100% F	0	n/a	n/a	72.3
Butt Creek	2001	1	900	11.2	44%G 56%F	1.6	0.5	27.7	51.2
		2	700	7	72%G14%F	1.9	0.5	24	43.9
		3	400	12.2	1005F	4.5	0.7	31.5	50.8
		4	500	13.2	60%G 40%F	5	0.5	35	50.2
		5	700	23.4	100%F	6	0.4	36	58.9
		6	1300	7.6	23%G 77%F	3.5	0.3	36.3	79.3
		7	200	8	100% G	4.5	0.2	43.4	82
		8	800	9.1	38%g 38%F	0.5	0.2	31.5	81.1
Yellow Creek	2001	1	800	4.9	63%G 37%F	0.6	0.7	5.3	55
		2	1400	12.5	7%G 50%F	2.2	0.4	11.5	21
		3	600	13.2	17%G 83%F	1.3	0.4	6.3	11.8
		4	100	.3	100%G	.1	0.4	16	47
		5	700	5.3	86%G 0%F	1.9	0.3	5	48.5
		6	700	3.4	29%G 57%F	0.9	0.3	10.7	35.7
		7	2000	16	50%G 45%F	2.3	0.4	15.6	63.4
		8	1800	11.6	72%G 28%F	1.5	0.3	11.1	77.7
		9	500	7.8	40%G 60%F	0.2	0.2	NA	66
Grizzly Creek	2002	1	400	12	100%G	3.8	0.3	17	78.5
		2	700	14.3	100%G	3.1	0.3	18.6	84
		3	2800	8.4	100%G	4	0.5	4.9	70
		4	300	2.7	100%G	1.7	0.4	0.4	61.7
		5	600	17.7	100%G	1.7	0.3	NA	47.8
		6	400	10.8	50%G 50%F	NA	NA	NA	91

Source: Summarized from inventories conducted 2001-2002

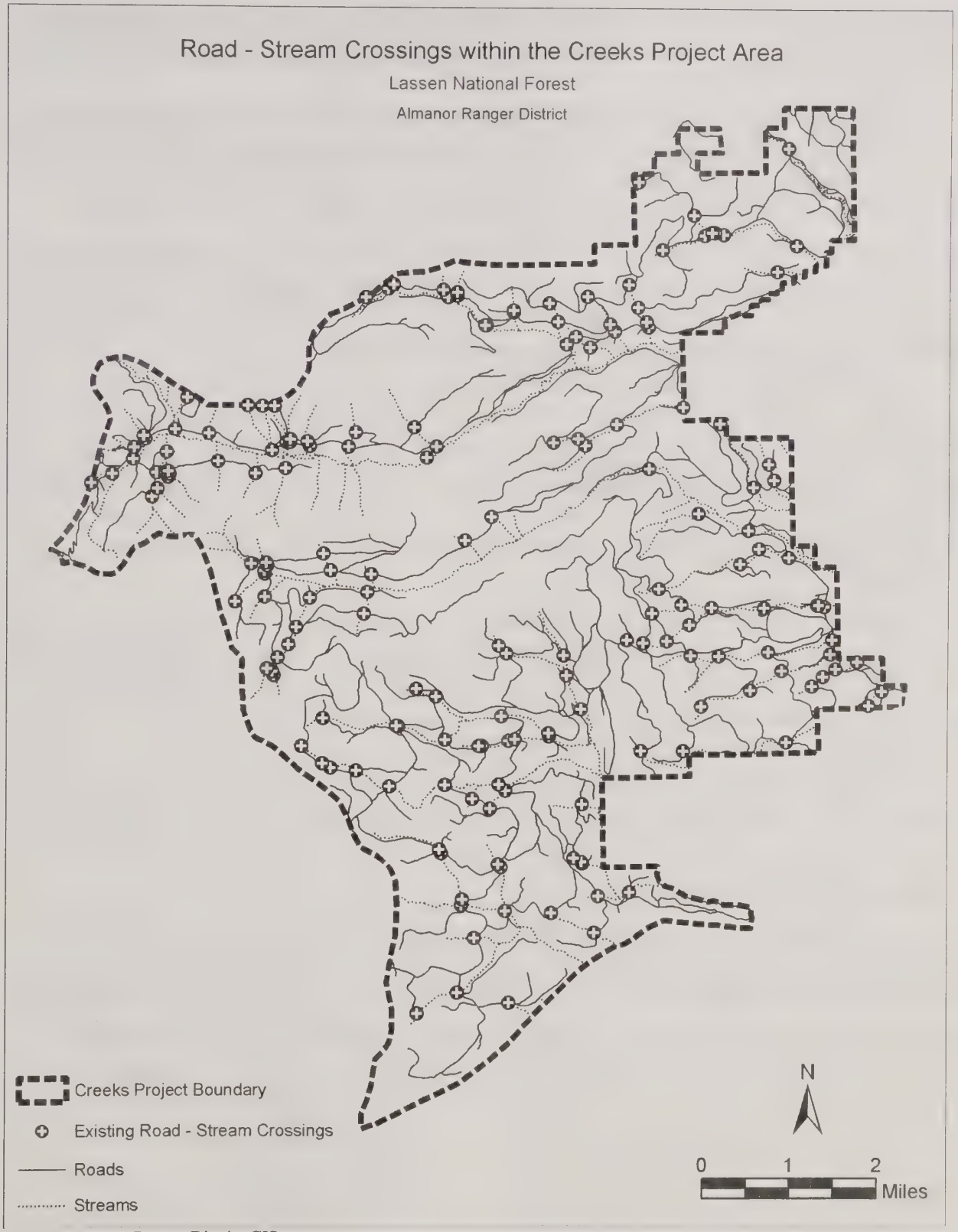
Temperature, Shade and Large Woody Debris

Data from stream inventories (sees 3-67 and 3-68) indicate that Butt Creek has the lowest stream shading. Stream shading is lowest in the low gradient meadow type streams in the project area (Butt Creek and Yellow Creek). In steeper channels, typically dominated by coniferous streamside vegetation (e.g. Grizzly Creek, Water Creek) shading is higher, though some sections of these streams were affected by the Storrie Fire where the fire burned hot enough to kill streamside vegetation. Based on the levels of shading, that appear normal for the stream types, water temperatures do not appear to be a problem in project area streams. Large wood is important to the aquatic environment because it routes and stores sediment, provides habitat complexity and acts as a substrate for biological activity. Stream surveys (information summarized in 3-68) show that potential for recruitment of large wood had no ratings of poor, and was generally good in streams dominated by coniferous vegetation (Shanghai Creek, Grizzly Creek) and fair-good in lower gradient streams (Butt Creek, Yellow Creek). Inventory data also indicates in-channel large wood is present in all streams surveyed.

Floodplains and Wetlands

Wetlands and small aquatic habitats including springs, seeps, and fens exist in several locations in the project area, often associated with wet stringer meadows in valley bottoms. Stream Condition Inventory data from low gradient stream reaches in Butt and Yellow Creek (Table 3-67) indicate these reaches are generally in poor condition, as evidenced by large width/depth ratios (ratios of 15 to 20 would indicate "good" condition) and relatively high percentages of unstable banks. These indicators are consistent with assessments of stream function and stream stability presented in the range section (Table 3-81). The inference is that channel conditions in these low gradient reaches are in less than desired conditions as the result of past grazing. Repeat measurements (in 2002 and 2004) of channel condition on Butt Creek (see Table 3-67) indicate that conditions may be improving.

Figure 3-22. Road-Stream Crossings within the Creeks Project Area



Source: Almanor Ranger District GIS

Water Yield

There are no stream gauges located within the project area. Existing flow conditions were evaluated based on observations of channels and the level of existing watershed disturbance (including vegetation manipulation) in the watersheds.

A combination of data contained within District files and field reconnaissance surveys and inventories were conducted to assess conditions in the project area. All streams adjacent to project activity sites surveyed could be classified as being in good condition and were not showing evidence of instability as a result of increased flows or on-site disturbance. Most channels are well armored with a combination of bedrock outcrops, boulders, and cobbles making them resistant to change from higher flows. Floodplains exist on some higher order streams within the lower elevations of the project notably the lower reaches of Butt and portions of Yellow Creek as it enters and flows through Humbug Valley. Some instability is evident in these channels, but appears to be the result of past grazing activity rather than higher flows.

Past vegetation manipulation and overall disturbance are low (as indicated by ERA, Table 3-72) in most project area watersheds. Exceptions are Grizzly Creek and portions of Lemm Hollow sub-watershed that have moderately high levels of early seral vegetation, due primarily to loss of mature coniferous forest by the Storrie Fire. Given these levels of disturbance, it is likely that base flows are elevated slightly in these sub-watersheds with no measurable difference from historic flow regimes in other project sub-watersheds.

Aquatic Species (including sensitive and management indicator species)

Table 3-69 lists the Threatened, Endangered, and Sensitive species considered in this document.
Of the species listed in Table 3-69, only the mountain yellow-legged frog, Cascades frog and rainbow trout are considered in this document because they are known to have occurred historically in the Upper North Fork Feather River watershed and in or near the project area. California red-legged frogs are briefly discussed, because a site assessment for the species was prepared. The other Forest Service sensitive and federally listed species are not addressed further in this document. The following analysis is also presented in the Biological Evaluation for Forest Service Sensitive Aquatic Species for the Creeks Project, hereby incorporated by reference.

California Red-legged Frog

A California red-legged frog (CRLF) site assessment was prepared for the project (USDA FS, 2005c). The assessment was based on current distribution, museum records and historic sightings, and extensive habitat and amphibian surveys in the project area. These surveys included repeated nighttime surveys specific for CRLF. The site assessment concluded that the project area did not contain suitable habitat for CRLF and that no additional surveys were necessary. The US Fish and Wildlife Service reviewed the site assessment and concurred with its conclusions. Therefore, CRLF will not be addressed further in this document.

Table 3-69. Aquatic Threatened, Endangered, Sensitive and Management Indicator Species- Lassen NF

Species	Status	Considered	Rationale
Federally listed aquatic species that may occur on the Lassen National Forest:			
Central Valley steelhead ESU (*Oncorhynchus mykiss*)	Threatened	No	The NF Feather River provided historic habitat for Spring Run Salmon and steelhead. Construction of Lake Almanor in the early 1900s, and subsequent construction of hydroelectric facilities along the NF Feather River have blocked access of this species which now moves upstream only as far as the Oroville hatchery.
Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*)	Threatened	No	Rationale as above for steelhead
California red-legged frog (*Rana aurora draytonii*)	Threatened	No	Based on the compilation of historical distribution information for the California red-legged frog, including review of museum specimens, no sightings of this species have been documented in or near the project area, or on the Lassen National Forest. As directed by the 1999 HFQLG ROD, a site assessment for CRLF was prepared for this project. The assessment concluded the suitable habitat within the project area had been surveyed and did not warrant survey of additional areas.
Shasta Crayfish (*Pacifastacus fortis*)	Endangered	No	The project area is outside of the known historical range of this species.
The Regional Forester's sensitive species list includes the following aquatic species as sensitive on the Lassen National Forest:			
Foothill yellow-legged frog (*Rana boylii*)	Forest Service Sensitive	No	The upper elevational range of the foothill yellow-legged frog is considered 4500 feet. The nearest current known population of this species is located near Hole-in-the-Ground on Mill Creek, about 8 miles northwest of the nearest activity area, at an elevation of about 4200 feet. The lack of historical sightings or museum records of this species supports the conclusion that the project area lies outside their range.
Mountain yellow-legged frog (*Rana muscosa*)	Forest Service Sensitive	Yes	Considered in this document because they are known to occur, and have occurred historically in the Upper North Fork Feather River watershed and near the project.
Cascades frog (*Rana cascadae*)	Forest Service Sensitive	Yes	Considered in this document because they are known to occur, and have occurred historically in the Upper North Fork Feather River watershed and near the project.
California floater (*Anodonta Californians*)	Forest Service Sensitive	No	Aquatic conditions within the project area do not meet one or more of known habitat conditions suitable for this species: large spring or slow stream, lake, mud-sand substrate, low or mid-elevation.
Great Basin Rams-horn (*Helisoma newberryi*	Forest Service	No	The project area is not within the known historical range of these species.

Species	Status	Considered	Rationale
newberryi)	Sensitive		
Scalloped Juga (*Juga occata*)	Forest Service Sensitive	No	The project area is not within the known historical range of these species.
Topaz Juga (*Juga acutifilosa*)	Forest Service Sensitive	No	The project area is not within the known historical range of these species.
Montane Peaclam (*Pisidium ultramontanum*)	Forest Service Sensitive	No	The project area is not within the known historical range of these species.
Nugget pebblesnail (*Fluminicola seminalis*)	Forest Service Sensitive	No	The project area is outside of the known historical range of this species.
Eagle Lake Rainbow trout (*Oncorhynchus mykiss aquilarum*)	Forest Service Sensitive	No	The project is outside the historical range of the species.
Central Valley fall/late-fall-run Chinook salmon ESUs (*Oncorhynchus tshawytscha*)	Forest Service Sensitive	No	Rational as above for steelhead and Spring-run Chinook salmon
Aquatic Management Indicator Species:			
Rainbow Trout (*Oncorhynchus mykiss*)	Lassen NF MIS	Yes	Well distributed in project area

Source: R5 sensitive species list, Lassen NF LRMP (1993), Appendix O.

Cascades Frog and Mountain Yellow-Legged Frog

No populations of Cascades frogs or mountain yellow-legged frogs (MYLF) (Forest Service sensitive species) are known to exist within the project area. There have been two incidental observations of amphibians from Butt Creek since 1996. One observation was made during a stream survey in 1996, the other by a contractor conducting avian surveys in 2002. Both observers thought they saw Cascades frog, however the species identification was not confirmed, and photographs were not taken in either case. For these reasons, one or both observations may have been MYLF or tree frog (*Hyla regilla*, which is not a sensitive species but found in the project area). Repeated amphibian surveys of the area have not confirmed the sightings to be MYLF.

The Cascades frog is present to the west of the project area in Willow and Colby Creeks which drain to Butte Creek and subsequently to the Sacramento River and north of the project area in Carter Creek, which drains to Deer Creek then the Sacramento River. It is also found in Warner Creek, about 15 miles north of the Creeks project, which drains into Lake Almanor and down the East Fork North Feather River. The Creeks project drains to Yellow Creek then to North Fork Feather River.

Historically, Cascades frogs appear to have been more abundant and widely distributed. Museum records dating from 1924 to 1971 document the presence of Cascades frogs at Little Grizzly Valley (2 sightings) and at three locations in tributaries to Humbug Valley, which is east of the project area. The nearest of these locations is Big Springs. Repeated surveys of these sites (Little Grizzly Valley by Fellers [1998] and California Academy of Sciences [Koo et al, 2003]; Big Springs by Fellers, California Academy of Sciences and Forest Service) have not found Cascades frogs.

There is presently one known population of MYLF on the Lassen NF. This population was recently confirmed by USFS crews (2005) at Oliver Lake, approximately 8 miles south of the project area. The other nearest populations are on the Plumas NF, from Bean Creek approximately 12 miles SE of the project area and the Boulder Creek watershed more than 25 miles east of the project area.

Historic records from California Academy of Sciences (2003), dating from 1923 to 1966, document specimens of MYLF from Butte Meadows, Jonesville, West Branch Feather River at Coon Hollow, and Coon Hollow Snag Lake (all these locations are in the Butte Creek Watershed). There is also a 1961 record from Butt Creek (8 miles east of Jonesville). Butt Creek is the only historic sighting within the Creeks analysis area. Crews from the CAS and the Forest Service have resurveyed these locations over the past five years. These surveys found no frogs at the historic sighting location.

Despite the absence of known populations, perennial streams, springs and wetlands within the project area are considered suitable habitat for Cascades frog. High elevation lakes perennial streams with pools greater than a foot in depth, slow-moving portions of streams as well as riparian corridors and wetlands within the project area are considered suitable habitat for mountain yellow-legged frog.

Rainbow Trout

Rainbow Trout (MIS) are fairly well distributed throughout the perennial streams within the project area, with populations identified in Butt Creek, Water Creek, Grizzly Creek, Shanghai Creek and Yellow Creek. The species undoubtedly uses some seasonally flowing channels in these watersheds for spawning. No rainbow trout (RBT) were found in either Rock Creek or Saw Mill Tom Creek. Brook trout were found in those two creeks, as well as Butt, Water, Grizzly and Yellow Creeks. Brown trout were found in the same creeks where RBT were located. Distribution of rainbow trout in the project area was determined by stream inventories and snorkel surveys. Results from snorkel surveys (conducted in 2002) are provided in Table 3-70. Surveys found relatively high numbers in all perennial streams.

Data from stream inventories (presented in Table 3-68) shows that project area streams generally have low sediment in pool tails (exceptions noted above under sediment discussion). Large wood and pools were present in desired amounts except in a few, low gradient meadow reaches.

Table 3-70. Creeks project area snorkel survey summary

Stream	Rainbow Trout		Brown Trout		Brook Trout	
	Mean no. per pool	Mean no. per riffle	Mean no. per pool	Mean no. per riffle	Mean no. per pool	Mean no. per riffle
Butt Creek	11.5	2.8	0	0	0.1	0.1
Water Creek	1	1.3	0.2	0	0.1	0
Grizzly Creek	4.2	1.3	2.3	0.5	0.2	0
Rock Creek	0	0	0	0	5.1	0.9
Sawmill Tom Creek	0	0	0	0	2.9	1.5
Shanghai Creek	1.4	0.3	0	0	0	0
Yellow Creek	3.4	0	4.2	1.4	0	2.2

Source: Snorkel survey data collected in 2002, Almanor RD

Environmental Effects

Alternative 1

Direct and Indirect Effects to Sediment

Forest harvest and thinning activities are not expected to measurably increase delivery of sediment to stream channels. All harvest activities would include project design features and Forest Service BMPs (USDA FS, 2000a) to reduce the risk of on-site erosion. Soil cover would be maintained in treatment units except where skidtrails, landings and temporary roads were constructed. On these sites, water barring, post treatment decommissioning (landings and temporary roads) and other erosion control measures would minimize the risk of increased erosion. Riparian Habitat Conservation Areas (RHCAs) would be in place adjacent to all aquatic habitats. Management within these zones would be designed to meet Riparian Management Objectives and includes limited harvest. One function of RHCAs is to buffer channels from upslope disturbance. As such zones of 30m (approximately 100 ft) in width have shown to be effective in protecting habitats and aquatic communities (Newbold, et al 1980); RHCAs designated in this project (300 ft total width with 150 ft inner exclusion zone) would protect habitats from upslope disturbance. In RHCAs where harvest will occur, there will be no mechanical entry within the inner zones and no new landings or skid trails would be constructed. Therefore, delivery of sediment from treatment units to channels would be minimal.

The proposed action would construct 3.7 miles of new temporary roads, and reconstruct 5.0 miles of already existing non-FS system roads as temporary roads. These temporary roads would be constructed to follow the rise and fall of the land to reduce excavation. All temporary roads utilized during the project would be decommissioned as described in the integrated design features for this project. Overall, there would be a net reduction in total road miles.

No new channel crossings would be constructed. Four crossings on existing non-system roads would be removed when these roads are decommissioned. Two of these crossings are in the Grizzly Creek watershed; the others are in the Fanani (lower Butt Creek) and Shanghai sub-watersheds. Removal of the crossings would result in a short-term increase in sediment in stream reaches below these crossings. Removal of the crossings would result in long-term reduction in sediment delivery at the sites and would benefit aquatic habitat.

Even with accelerated erosion in project watersheds resulting from the Storrie Fire and subsequent salvage logging (Lemm Hollow and Grizzly sub-watersheds in particular), road related erosion is the primary source of existing, accelerated erosion. This finding is based on field surveys, and in conformance with local surveys of erosion (Meadowbrook Conservation Associates, 1997) and literature on erosion from wildland watersheds (Furniss et al., 1991). The same sources of information also indicate that the great majority of sediment from roads originates at channel crossings. Because the proposed action would add or improve surface at over 80% of the road crossings in the project watersheds, a reduction of sediment delivery in channels is expected in the long term.

In the short term, immediate reductions in sediment delivery resulting from road surfacing may be offset to some degree by increases in sediment delivery that result from log hauling and road maintenance, particularly those activities that bare drainage ditches with connection to stream channels. If winter road hauling was conducted, and not properly controlled, increases in short term sediment production might also occur. Luce and Black (1999) found increases in sediment production (not delivery) increased about seven times as a result of winter haul and road maintenance (especially ditch clearing). Luce and Black (2001) found increases in sediment production recovered rapidly: 50% in first year, 90% in three years.

Uncertainties about the degree of existing channel connection with road drainage features is reflected in estimates of sediment delivery reduction shown in Table 3-71. Even with treatment under the proposed action, sediment reduction is rated as being low to medium because surfacing would substantially reduce sediment from the road surface, but not from ditches and other features that directly connect to drainages. Research indicates that surfacing at the crossings may reduce delivery of sediment to channels by 10 to 25 times the existing condition (MacDonald, 2005). Reductions in sediment delivery would also result from treatment of up to 48 miles (about 30% of roads in the project area) of road surface (apart from crossings). This would result in reductions in both the short and long term.

Table 3-71. Creeks Project Area Stream Crossings: Sediment Production with and without treatment by Road Surface Type.

Road Surface Type	Number	Current Condition	Proposed Action Condition
Dirt	70	High	Low/Medium
Gravel	20	Low/Medium	Low/Medium
Other-Treated	61	Medium/High	Low/Medium
Other-Untreated	29	Medium/High	Medium/High

Condition is estimated rate of erosion
Source: Almanor RD GIS road and stream layers, LNF road information database (INFRA)

Therefore, our expectation is a long-term decrease in sediment delivery as a result of the proposed action. In the short term, the time during which roads are used for haul, it is expected sediment reductions from road surface and road surface treatments at crossings would be balanced by increases due to road maintenance.

Direct and Indirect Effects to Temperature, Shade and Large Woody Debris

Vegetation that provides shade to aquatic habitats would not be removed, so temperature increases from a reduction of canopy and increase in sunlight are not expected. The project does not propose enough vegetative removal within the stream channels to result in measurable changes in flow, therefore changes in temperature due to changes in flow would not occur.

Thinning could reduce shade within RHCAs and result in changes in air temperature and ground moisture. Because RHCA prescriptions would retain trees larger than 30 inches and canopy cover would not be reduced below 40 to 50% changes to air temperature are expected to be minor.

Prescriptions for treatments within RHCAs are designed to improve stand condition and promote long-term health of the drier mixed conifer type vegetation. The effects of the Storrie Fire on some riparian zones suggest that stands more resilient to wildfire would better meet RMOs in the long term. Field observations of the Storrie Fire showed a range of fire intensities and effects. In lightly and moderately burned areas, fire effects were either beneficial (in terms of removing fuels and thinning stands) or produced short-term detrimental effects (loss of ground cover soon replaced by needle fall). In areas with high intensity burns, effects were detrimental. Ground cover was removed and vegetation was killed. Stream shade was nearly completely removed, and large and small organic material was eliminated.

To protect streams from project activity impacts, mechanized entry would not be allowed in the inner zone of RHCAs. Entry into RHCAs would be limited as described in the proposed action. Fuels would be removed from the inner zone with mechanized grapples, endlining, or hand thinning. To protect channel stability and

maintain channel shading no vegetation with channel bank rootmass or that provide shade to any stream channel would be removed or disturbed. Further, no riparian vegetation (non-coniferous) would be intentionally removed or thinned within the RHCAs.

Because thinning of non-riparian tree species would occur within RHCAs, recruitment of woody material would be affected. The prescription inside the RHCA is intended to result in a stand that more closely resembles stands thought to have occurred in the project area prior to the suppression of fire. Some small trees would be removed. In the short term, these small pieces would not be available for recruitment. In the long term, treated stands would produce larger recruitable trees. Therefore, the likely result is a possible reduction in the number of trees recruited to channels, followed by a long-term increase in the volume of recruited material. This generalized response would differ in areas immediately adjacent to channels. The design criteria retain trees that contribute to stream stability and/or provide shade so LWD delivery from these areas would remain unchanged. Since in-channel LWD comes primarily from trees on or near channel banks the overall effect on LWD recruitment would only be marginally affected.

Direct and Indirect Effects to Floodplains and Wetlands

No floodplains or wetlands would be negatively affected by this project. Special management of RHCAs would prevent impacts to those areas. Further discussion on project related effects on riparian areas and riparian management objectives follows the evaluation of the no-action alternative.

Direct and Indirect Effects to Water Yield

Water yield has been shown to increase due to forest management activities in small watersheds (Troendle, 1987). These effects can be measurable and important for small watersheds (3rd order and smaller) where clearcutting occurs over 21 to 33 percent or more of the subwatershed. However, it is not expected that annual average water yield or peak flows in project watersheds would be detectable from the expected natural variability for these drainage systems. Project area headwater channels of 3rd order and smaller watersheds are generally well armored and very stable, so minor increases in flow would not lead to bank instability. Further, the project is proposing much less reduction in forest cover than the 21 to 33 percent of watershed area treated with patch cuts that resulted in the increased yield in the research cited above. It is estimated that canopy reductions in project area subwatersheds range from less than 1% to less than 10%. Changes to average annual streamflow, instantaneous peak flows, or maximum daily streamflows are generally not detectable in subwatersheds that are larger than 3rd order and have less than 21 to 33 percent forest cover removal (King, 1993).

There is low risk of peak flow increases from proposed activities. The amount of road surface in the project watersheds would be reduced by the proposed action. Roads have compacted surfaces that can contribute runoff, and often include drainage structures (ditches, relief culverts, etc.) that increase the drainage network and concentrate flow. Project related road maintenance activities would include improving surface drainage at crossings and approaches to crossings.

As discussed in the evaluation of direct effects to soils, timber harvest and fuels reduction activities would not measurably increase soil compaction (reference soils section); therefore, runoff at the site scale would not be measurably increased. RHCAs with mechanical exclusion zones would prevent compaction in areas with the highest flow delivery potential (near channels) and also serve to buffer runoff from upslope areas. In

summary, no measurable changes in either water yield or peak flows is expected as a result of project activities.

Direct and Indirect Effects to Cascades Frog and Mountain Yellow-Legged Frog

There are no known populations of either Cascades frog or MYLF in the project area. No documented sightings for either species have occurred within the project since 1961. Therefore, there is low likelihood of direct effects to either species from project activities. Although vegetation and fuels management activities are proposed within RHCAs, none would occur within stream channels, lakes, ponds, fens or wetlands and use of equipment is excluded within 150 feet of perennial streams. Prescribed burning would also occur within RHCAs and could result in individuals being burned over while crossing through upland habitats if Cascades frog or MYLF populations have gone undetected. Road activities would include removal of 4 existing crossings. All these sites are located on seasonally flowing stream channels. Since construction and removal activities would occur when channels are dry, the risk of direct effects to either amphibian sensitive species, or rainbow trout is negligible. Long-term reduction of sediment at these sites would result in improved condition at these sites.

Indirect effects to sensitive and management indicator species would occur if project activities resulted in changes to these species' habitat. The proposed project includes vegetation removal including use of mechanized equipment to transport materials, prescribed burning, road construction and road maintenance. The primary concern from these activities, relative to aquatic habitats, is an increase in erosion with resultant delivery of sediment to channels. Other concerns include changes to water temperature, water yield, and large woody debris recruitment and habitat connectivity.

Potential effects to water temperature, water yield and large woody debris were discussed above. The degree of changes to these habitat components is limited, and as a result no negative change in habitat conditions for these sensitive species is expected.

Direct and Indirect Effects to Rainbow Trout

There is a low risk that the proposed action would contribute toward adverse effects to rainbow trout. Project activities would not result in changes to water temperature or water yield. Recruitment of large woody debris would likely be unaffected in the short term, and slightly improved in the long term. As discussed above, there is some risk of an increase in short-term sediment delivery, especially in the Grizzly Creek sub-watershed. This risk would be largely or completely offset by treatment of existing erosion sources (road crossings). Therefore, the expectation is for a slight decrease or no change in sediment delivery in the short term, with a decrease in sediment delivery in the longer term. Overall, effects of the project would not be expected to result in a reduction in population or distribution of rainbow trout.

Cumulative Watershed Effects (CWE)

Changes from Draft to Final

ERA values for Upper Yellow and Lemm Hollow watersheds presented in this document differ from those contained in the draft EIS. Values (both watershed scale and within RHCA) for Upper Yellow were increased to reflect recent, ongoing and potential future timber harvest on private lands that did not conform with assumptions made for private land harvest in the draft. For Lemm Hollows, the value for areas within RHCAs

burned in the Storrie Fire was inadvertently applied to both the RHCA and watershed wide ERA calculation in the draft. This error was identified, and the corrected value is included in the final EIS.

Methodology

This analysis considers the project in addition to past, present and reasonably foreseeable actions, using the process prescribed for the Pacific Southwest Region of the Forest Service (USDA FS, 1988). Past activities included in the analysis are listed in Appendix A.

The cumulative effect analysis area for the Creeks Project includes ten subwatersheds (Figure 3-18) and Figure A-12 in Appendix A. The areas outside of the Creeks Project and within the affected subwatersheds include Forest Service managed lands, privately owned timber company lands, utility company lands, or other privately owned lands.

Beneficial Uses: Beneficial uses of water within the project include recreation, and support of aquatic communities. Aquatic fauna include MIS rainbow trout. Downstream beneficial uses include habitat for aquatic communities, recreation, power generation and agriculture. Of these, habitat for trout and other aquatic organisms is the use most likely to be affected by indirect or cumulative effects.

Mechanisms of Concern: Surface erosion and channel erosion, rather than mass wasting is the dominant erosional process in the project watersheds. Because analysis indicated that sediment delivery was the primary concern associated with project activities, it is the focus of this analysis of cumulative effects as related to overall disturbance within project subwatersheds. Changes to flow were also considered, but because analysis of indirect effects showed that changes in water yield and peak flow from project actions were not expected to be measurable, it is not further considered in this analysis.

Scale of Analysis: The analysis focuses on effects at the sub-watershed scale. Beneficial uses of most concern (aquatic communities) are supported at this scale, and changes in the mechanism of concern (surface erosion) can be detected. At larger scales, influences are diluted. A primary assumption of this analysis is that protection of beneficial uses at this scale also results in protection of uses at larger scales, in this case, downstream beneficial uses in Yellow Creek and the NF Feather River.

Indicators: Several indicators of watershed disturbance were used to assess the risk of cumulative watershed effects. These include Equivalent Roaded Acres (ERA), road density, number of road crossings, road density in RHCAs, and disturbance (ERA) in RHCAs.

Disturbance from past, present, currently proposed, and foreseeable future project activities within a subwatershed is estimated in the ERA method by relating the relative magnitude of the activities as compared to an acre of road disturbance. This is accomplished by applying "disturbance" coefficients to each type of ground-disturbing activity. Under this method each affected subwatershed is given a Threshold of Concern (TOC) based on watershed sensitivity indicators (soils, slopes, unstable lands, beneficial uses at risk, etc.). The TOC does not represent the exact point at which cumulative watershed effects will occur. Rather it serves as a "yellow flag" indicator of increasing susceptibility for adverse cumulative effects occurring within a watershed. Susceptibility of CWE generally increases from low to high as the level of land disturbing activities increase toward or past the TOC. TOC values on the Almanor Ranger District generally range between 12 and 18 percent. The ERA method assumes no recovery from roads. The method assumes recovery over thirty years for other ground disturbing activities. Recovery is reflected in the model by applying a recovery coefficient to

each past activity. Table 3-72 provides information regarding the cumulative watershed effects using equivalent roaded acres for each of the project area sub-watersheds.

Recent research (MacDonald et. al. 2004), supported by local and regional field evaluations have consistently found roads to be the primary source of accelerated erosion in wildland watersheds. Both road density and the number of stream crossings are gross indicators of the level of road impacts in watersheds. McGurk and Fong (1995) found a relationship between stream insect communities and the amount of disturbance in streamside zones. Two measures of disturbance near streams, road density in RHCAs, and ERA within RHCAs were calculated for pre and post project conditions (Table 3-73). The LNF has no standards for these indicators of watershed risk but an upward trend in these attributes would indicate higher levels of risk. McGurk and Fong (1995) found a decrease in benthic macroinvertebrate communities when "nearstream" ERA reached 7%.

Table 3-72. Threshold of Concern and Pre and Post Proposed Action (PA) Equivalent Roaded Acres (ERAs).

Sub Watershed	Threshold of Concern (TOC) % ERA	Current ERA	PA ERA	PA 5yrs	PA 20yrs	Alt 14 ERA	Alt 14 5yrs	Alt 14 20yr
Fanani	16	4	4	4	4	4	4	4
Grizzly Creek	15	10	14	12	7	14	12	7
Humbug Valley	16	4	6	5	4	6	5	4
Lemm Hollows	15	9	13	8	4	13	11	7
Marian Creek	16	3	3	3	3	3	3	3
Ruffa	16	3	5	3	2	5	3	2
Shanghai Creek	16	2	5	4	2	5	4	2
Soda Creek	15	4	5	4	2	4	5	4
Soldier Creek	16	3	3	3	2	3	3	2
Upper Yellow Creek	16	9	12	9	3	12	9	3

Source: From Cumulative Watershed Effects Spreadsheet

Results

ERA: ERAs (Table 3-72) are below the TOC for all sub-watersheds. Grizzly Creek and Lemm Hollow sub-watersheds are close to the threshold of concern. The high ERA levels in these two sub-watersheds represent high levels of disturbance from past, current, proposed and probable future activities. Disturbance in these sub-watersheds is primarily attributable to four sources: past activities on public lands; the Storrie Fire and subsequent salvage harvest including that on private lands, existing roads, and the proposed action. Of these factors, roads are the greatest concern because they have consistently been shown to be the primary source of increased sediment in forested watersheds. Roads are often connected hydrologically to channels, and unlike the other disturbances listed above, they do not recover over time. A 25 year recovery was assumed for the Storrie Fire. It is more likely that wildfire recovery occurs more rapidly (on the order of 3 to 5 years) so ERA estimates in areas burned by the Storrie Fire provide a conservative estimate of disturbance and risk.

It should be noted that range activities were considered but not included in the ERA analysis. The Soda Creek allotment covers over 28,000 acres, and includes portions of Upper Butte Creek, as well as portions of Soda Creek, Sawmill Tom Creek and portions of upper Yellow Creek in addition to the Grizzly Creek watershed. Given the limited intensity of grazing in the allotment (40 head annually) watershed, impacts from

grazing in Grizzly Creek (and other project area watersheds) would not measurably increase the risk of cumulative effects.

Road Density: Road Density (Table 3-73) would be reduced slightly in the project area as a result of decommissioning approximately five miles of existing unclassified roads and 1.2 miles of existing classified roads. Overall, the net reduction in roads within the project area would be 4.3 miles. The amount of decommissioning is low relative to the amount of road, so road densities at the sub-watershed scale remain unchanged. Since roads, and particularly road crossings are the source of the majority of current management related erosion, this result indicates the project would not measurably affect the risk of adverse affects. The same result is true of road crossings, the number of crossings would be reduced by four but relative to the high number of crossings (over 170) in the project area (Table 3-71) the reduction does not appreciably reduce risk at the sub-watershed scale.

Road Crossings: Though the number of crossings would be reduced only slightly, there would be a substantial reduction in sediment delivery from crossings because approximately 151 would be improved by adding or restoring road surface material, including approximately 49 within Grizzly Creek and 28 in Lemm Hollow subwatershed. Such road surfacing has been shown to reduce sediment production from forest roads five fold (MacDonald et. al. 2004). Because a substantial amount of existing chronic sediment delivery is associated with crossings, the result of these treatments would be a reduction of sediment in the project area streams.

ERA in RHCAs: The analysis shows that ERA in RHCAs would increase in five of the project sub-watersheds, remain unchanged in four, and be reduced in one. Increases would occur in Fananni (1%), Shanghai (2%), Grizzly (2%), Lemm Hollow (2%) and Humbug Valley (1%).

Lemm Hollow watershed has high existing levels of disturbance in RHCAs. This subwatershed is a composite of several small drainages. The southern portion of the subwatershed is comprised primarily of private land which was extensively burned and then the site of salvage harvest following the Storrie Fire. Due to these activities, ERAs in the RHCA is high. It is estimated to be 9.4% within RHCAs on private lands in the subwatershed, with 8.7% resulting from the fire and salvage harvest. The northern portion of the sub-watershed in mostly public land managed by the Forest Service and is drained by Water Creek, a tributary to Yellow Creek. This portion of the subwatershed has lower amounts of disturbance in the RHCAs (about 2%). Project treatments would increase ERA within the RHCAs in this portion of the watershed to about 4.6%.

Slight reductions in ERA in the RHCAs of Lemm and Grizzly Creeks due to road decommissioning (approximately one acre in Grizzly and two acres in Lemm) are not reflected in the values presented in Table 3-73. The project would construct no additional permanent road, road density in the RHCAs would not increase. The risk of detrimental effects represented by increases in ERA within RHCAs is diminished further by considering the type of activities contributing to the increased ERA. The practices, as described earlier, consist of thinning to improve stand conditions. Mechanized equipment is prohibited from the inner zone, and new skid trail and landing construction is prohibited within the entire RHCA. As the actions in the RHCAs meet RMO's (see discussion) and result in improved conditions in the long-term, the risk of negative cumulative effects from these actions is rated as low.

Summary: Both ERA and road density numbers in the Grizzly Creek subwatershed are currently high. This may be reflected in relatively high concentrations of fine sediment in reaches 1 and 2 (Table 3-68). The

current project increases disturbance in the watershed. The application of BMPs would minimize on-site impacts associated with the proposed action, while road surfacing and spot gravelling at road crossing sites would reduce delivery of sediment to project area streams. The road density, number of crossings, near stream ERA and ERA values do not reflect the benefits of the road treatment activities. There will be 0.17 miles of roads within Grizzly Creek that will be constructed and added to the transportation system. There will be 2.3 miles of existing roads that will be decommissioned, including 0.41 miles of classified roads. This will result in net decrease in road miles. In addition, there will be 49 road/stream crossings that will be surfaced. Although Grizzly Creek has relatively high levels of disturbance, a long-term reduction in sediment delivery is expected as a result of the proposed action. In the short term, sediment delivery would probably be reduced, but off-set to some degree from road maintenance activities that bare drainage ditches and increased traffic levels, especially during wet weather.

The proposed action treatments would not exceed the equivalent roaded area (ERA) threshold for the Grizzly Greek subwatershed and recovery from the Storrie fire is occurring and will continue to occur.

ERA within RHCAs is relatively high in Lemm Hollow and Upper Yellow sub-watersheds and would be increased in Lemm Hollow and four other sub-watersheds with the proposed action. Increases are due to thinning which would improve stand condition in the long term. No road construction would occur within RHCAs, and no mechanical disturbance would occur within the inner zone. The treatments therefore represent a low level of risk in the short term.

The proposed actions were designed to minimize potential adverse impacts to aquatic habitat within the project area in recognition of existing watershed conditions due to lasting impacts of the Storrie fire, high road densities and high number of road crossings. Based on the results of the CWE analysis, implementation of BMPs and integrated design features (including RHCA designations and prescriptions), the risk of adverse cumulative effects to aquatic resources within the project area is low and beneficial uses of would be maintained. The analysis concluded that there is no loss of aquatic/riparian habitat and therefore there is no cumulative contribution to the loss of suitable habitat for aquatic and riparian dependent species within the HFQLG Pilot Project Area.

Cumulative Effects: Aquatic Species and Habitat Connectivity

Factors contributing to the decline in amphibian populations worldwide include: acid precipitation, ultraviolet radiation, global climate, non-native fish predation, drought, loss of aquatic habitat and increases in erosion and siltation from management activities. Non-native fish predation (brook trout and brown trout) may be or have been an impact on amphibian species in the project area streams where they are present (see Table 3-70). The proposed action would not impact this process. Of the other factors listed above, increased erosion and sedimentation is the effect of most concern. This is because the project involves considerable ground disturbing activities. Effects of increased sediment delivery on rainbow trout habitat is also the primary concern for that management indicator species.

Table 3-73. Road densities and RHCA ERAs for the Current Condition and Proposed Action (PA).

Sub-watershed	Sub-watershed Area (acres)	Road Density (miles/sq . mile)	PA Road Density (miles/sq . mile)	RHCA Road Miles	PA RHCA Roads (miles)	Alt 14 RHCA Roads (miles)	RHCA ERA (%)	PA RHCA ERA (%)	Alt 14 RHCA ERA (%)
Fanani	10,822	5	5	6	6	6	2	3	3
Grizzly Creek	7,435	6	6	8	8	8	3	5	5
Humbug Valley	5,627	6	6	9	9	9	2	1	1
Lemm Hollow	5,233	5	5	8	8	8	8	10	10
Marian Creek	7,205	6	6	6	6	6	3	3	3
Ruffa	7,801	3	3	6	6	6	3	4	4
Shanghai Creek	2,849	3	3	3	3	3	3	5	5
Soda Creek	9175	3	3	3	3	2	2	2	2
Soldier Creek	9795	3	3	13	13	2	2	2	2
Upper Yellow Creek	6981	5	5	7	7	6	7	7	7

Source: Almanor RD GIS road and watershed layers, cumulative effects spreadsheets

Likelihood of adverse cumulative change to sediment delivery are discussed above and summarized here. Both ERA and road density numbers in the Grizzly Creek and Lemm Hollow subwatersheds are currently high. The current project increases disturbance in these watersheds. The application of BMPs would minimize on-site impacts associated with the proposed action, while road surfacing and spot gravelling at road crossing sites would reduce delivery of sediment to project area streams. The road density, number of crossings, nearstream ERA and ERA values do not reflect the benefits of the road treatment activities. As discussed earlier under indirect effects for sediment, a long-term reduction in sediment delivery is expected as a result of the proposed action. In the short term, sediment delivery would probably be reduced, but off-set to some degree by road maintenance activities that bare drainage ditches

Cumulative effects of actions on habitat connectivity, large wood recruitment, shade, water temperature and water yield were also considered. The combination of past activities reflects the current condition of aquatic habitats in the project area. Most project area perennial stream habitat was inventoried. Impacts of past range management, past and present road management activities, and effects of the Storrie Fire were noted as specific activities that have affected habitat condition. Generally, range management has adversely affected channel stability and stream shading in low gradient meadow type reaches (typical of Butt Creek and Yellow Creek). Roads have increased sediment delivery to most project area streams, and the Storrie Fire has increased sediment delivery and reduced stream shading in portions of Grizzly Creek, and the channels in the Lemm Hollow sub-watershed.

Evaluation of indirect effects on these processes from the project found expected changes to be minor or unlikely, so no change in habitat conditions would be expected from past activities, present activities and project activities.

Future activities that could impact these processes include timber harvest on both public and private lands, and revised grazing management. Future harvest on public lands would be subject to the same standards and guidelines at the site and watershed scale as at present which would preclude actions with substantial risk of causing adverse cumulative effects. The same assumption is applied to any revision or range management

activities on public lands. Additional timber harvest on private lands could negatively affect aquatic habitats if proper controls were not applied on site, especially in regard to protection of channels and streamside zones. Due to land ownership (public lands generally lying upslope of private lands) such changes would affect habitat on private land, and for some attributes (e.g. temperature) downstream habitats. Our analysis concludes the proposed action would not negatively affect large wood, temperature, habitat connectivity and other habitat attributes, therefore, they would not contribute to any future cumulative effects on these attributes.

The project does not propose any new permanent road crossings, therefore, connectivity for amphibians or rainbow trout would not be affected. Removal of four existing temporary road crossings can be expected to improve connectivity of channels at the reach scale of the affected crossings. Due to the high number of crossings in project area streams removal of four crossings by decommissioning would not result in improved connectivity at larger scales.

Exclusion of mechanical equipment from streams, wetlands, ponds, lakes and other aquatic habitats and the inner zones of RHCAs adjacent to these habitats would reduce the risk of suitable habitat loss for Cascades frog, MYLF and rainbow trout. Although short-term, localized increase in sediment could occur from road-related activities, such changes would be small in spatial and temporal extent (a few channel widths in length, a few years in duration). Therefore, habitat quality would not be reduced to the extent where habitat unsuitable to movement would be created.

Alternative 2

Direct, Indirect and Cumulative Effects to Sediment

Sediment production from project area watersheds would remain in its present condition or lacking adequate road maintenance may slightly increase. The primary source of sediment in the project area is existing roads, and road-channel crossings associated with those roads. There would be little change in the density of the road system, the number of road crossings, or the condition of the road crossings. Unlike harvested stands and areas burned by wildfire, roads display virtually no recovery. Instead, continued deterioration of road surfacing (gravel) would be expected and increases in sediment delivery from the road system would likely occur. Large wildfires of high intensity in project area watersheds would increase sediment production substantially over the short (1 to 5 yr) term.

Direct, Indirect and Cumulative Effects to Temperature, Shade and Large Woody Debris

No changes in either shading of aquatic habitats or water temperature would result, because there would be no treatment of vegetation that provides shade. These conditions could change if a wildfire of high intensity were to kill vegetation in riparian areas. High intensity wildfire in the streamside areas would likely increase delivery of large wood to channels in the mid-term (5 to 20 years) but result in longer term reductions in wood delivery.

Direct, Indirect and Cumulative Effects to Floodplains and Wetlands

No changes in condition of floodplains or wetlands would be expected to occur with no action. Existing trends in condition (both positive and negative) would be expected to continue for the foreseeable future, in the absence of a large, high intensity wildfire.

Direct, Indirect and Cumulative Effects to Water Yield

Barring wildfires of high severity occurring in project area watersheds, current water yield conditions would be maintained with very little change in the short or long term. Vegetation in previously harvested stands and areas burned by the Storrie Fire would continue to mature. Evapotranspiration in these sites would increase, with resulting decreases in soil moisture, and slight decreases in water yield. High intensity wildfires that burned high percentages of project area watersheds would likely result in significantly increased sedimentation and degradation of stream habitats. Water temperatures would be increased if streamside vegetation were killed.

Direct, Indirect and Cumulative Effects to Aquatic Species

As no action would preclude any activities, there would be no short term direct or indirect effects to sensitive or management indicator aquatic species, or their habitat. In the long term, sediment conditions would remain unchanged, rather than be improved, so habitat for MIS rainbow trout would remain unchanged.

Cumulative Watershed Effects – Equivalent Roaded Acres

One measure of overall watershed disturbance (equivalent roaded acres, Table 3-72) would improve slightly over time as previously harvested areas and areas burned by the Storrie Fire recover. Other indicators of disturbance (road density, number of road crossings, Table 3-73) would remain unchanged. The amount of disturbance in near stream areas, as measured by equivalent roaded acres in RHCAs (Table 3-73), would decrease slightly, also due to recovery of previously harvested areas.

Cumulative Effects, Aquatic Species and Connectivity

Opportunities related to road decommissioning would be lost, so connectivity at the reach scale where those actions occur would be less, but connectivity at the project scale for aquatic species and there habitats would remain unchanged.

Alternative 14

Direct, Indirect and Cumulative Effects to Soils

Alternative 14 would treat approximately 59 fewer acres (group selection), so there would be no risk of reduced soil quality on those acres. With that exception, the effects on soils resources are identical with those described for Alternative 1.

Direct, Indirect and Cumulative Effects to Sediment

Alternative 14 poses a slightly lower risk of erosion and sediment delivery from harvest activities than Alternative 1 because approximately 59 fewer acres would be treated by group selection. There is however, no difference in sediment delivery between the two alternatives for the following reasons:

Given the on-site controls to limit soil erosion in all treatment units and presence of RHCAs adjacent to streams and other aquatic habitats, the risk of sediment delivery from project units (as discussed under Alternative 1) is low. The difference in treated acres between the two alternatives is small at both the project and sub-watershed scales. Proposed treatments to reduce erosion from roads are consistent between alternatives. Sediment from existing sources (roads, past treatments and other activities) are consistent.

Direct, Indirect and Cumulative Effects to Temperature, Shade and Large Woody Debris

Direct and indirect effects on these attributes would be the same as those described under Alternative 1. Alternative 14 would retain slightly more canopy cover in the outer zone of several units. Actions in the outer

zone of RHCAs would not be expected to affect stream shading (and therefore changes in stream temperature) or recruitment of large wood.

Direct, Indirect and Cumulative Effects to Floodplains and Wetlands

No floodplains or wetlands would be negatively affected by Alternative 14. Special management of RHCAs would prevent impacts to those areas. Further discussion of project related effects on riparian areas is included in the Riparian Management Objectives section.

Direct, Indirect and Cumulative Effects to Water Yield

Alternative 14 includes 59 fewer acres of groups than Alternative 1. This includes approximately 28 acres in Grizzly Creek, 7 acres in Lemm Hollow, 7 acres in Ruffa, 10 acres in Upper Yellow, 6 acres in Humbug and 2 acres in Fananni sub-watersheds. Because fewer acres would be treated, water yields resulting from vegetation treatments would be expected to be slightly less than those from Alternative 1. As with Alternative 1, any change to water yields would not be measurable due to natural variation.

Potential for changes in peak flows would be identical to Alternative 1 because the same on site controls, and exclusion of mechanized equipment from areas with the greatest flow delivery potential would be in place with Alternative 14.

Direct, Indirect and Cumulative Effects to Cascades Frog and Mountain Yellow-legged Frog

Because the reduced number of group selection acres would not result in changes to sediment delivery or water yield from Alternative 1, and there are no differences in effects to shade, temperature or woody debris recruitment between these alternatives, there would be no difference in direct or indirect effects on these species or their habitat than those described for Alternative 1.

Direct, Indirect and Cumulative Effects to Rainbow Trout

Because the reduced number of group selection acres would not result in changes to sediment delivery or water yield from Alternative 1, and there are no differences in effects to shade, temperature or woody debris recruitment between these alternatives, there would be no difference in direct or indirect effects on rainbow trout or their habitat than those described for Alternative 1.

Cumulative Watershed Effects – Equivalent Roaded Acres

Watershed Disturbance as indicated by Equivalent Roaded Acres is incrementally less with Alternative 14 than Alternative 1. Reduction in ERA values for all sub-watersheds ranges between 0.01 and 0.10, with Grizzly Creek realizing the largest decline. Therefore risk of adverse cumulative effects indicated by this metric is essentially the same as discussed under Alternative 1.

Cumulative Watershed Effects – Road Density, Road Crossings, and ERA in RHCA

These indicators of watershed disturbance are identical between Alternative 14 and Alternative 1, therefore discussion of these attributes in Alternative 1 is applicable to Alternative 14. The risk of adverse cumulative effects is essentially the same as those discussed for Alternative 1

Cumulative Effects to Aquatic Species and Habitat Connectivity

Because there is no difference between Alternative 14 and Alternative 1 in terms of cumulative watershed effects or indirect effects to aquatic habitat attributes (shade, large wood recruitment, etc.) the discussion of cumulative effects to aquatic species is the same as Alternative 1.

Because there are no differences between Alternative 14 and 1 in regard to indirect effects to habitat and there are no differences between these alternatives relative to road construction, road decommissioning or other in-channel activities, there is no difference in impacts to aquatic habitat connectivity between the alternatives.

Considering known life history requirements, current conditions, historical and current survey information, and integrated design features, it is determined that implementation of the Creeks Project may affect individuals but is not likely to result in a trend toward Federal listing or loss of viability for the Cascades frog or the Mountain Yellow-Legged Frog. The project is not expected to adversely affect the numbers or distribution of rainbow trout.

Botany

Table 3-74 Threatened, Endangered, and Sensitive plant species considered in this document. Species analyzed within this section are based on known occurrences and potential habitat. This analysis is also presented in the Biological Evaluation for Sensitive Plants for the Creeks Forest Health Recovery Project, hereby incorporated by reference.

Table 3-74. Threatened, Endangered, and Sensitive plant species within the Creeks Project area.

Species	Status*	Considered	Reasons
Orcuttia tenuis - slender Orcutt grass	FT	No	Analysis area lacks vernal pool habitat required by this species; below 5800 ft
Tuctoria greenei - Greene's tuctoria	FE	No	Analysis area lacks vernal pool habitat.
Arabis constancei - Constance's rock cress	S	No	Serpentine rock outcrops or soil not present in project area; 3500-6750 ft.
Astragalus pulsiferae var. suksdorfii - Suksdorf's milk-vetch	S	No	Analysis area lacks sandy volcanic soil in sagebrush or pines; 4500-6500 ft.
Botrychium ascendens - upswept moonwort	S	Yes	Moist meadows or riparian areas within coniferous forest has been moderately well surveyed and species not found, but potential habitat exists within project area; 5000-6000.
Botrychium crenulatum - scalloped moonwort	S	Yes	Moist habitats such as meadows, seeps and springs within coniferous forests moderately well surveyed and species not found, but potential habitat exists in project area. 4900-10700.
Botrychium minganense - Mingan moonwort	S	Yes	Species present
Botrychium montanum - western goblin	S	Yes	Species present
Calochortus longebarbatus var. longebarbatus – long haired star tulip	S	No	Eastside seasonally wet meadows not present in the analysis area; 4000-6300 ft.
Calycadenia oppositifolia - Butte County calycadenia	S	No	Low elevation foothill grassland habitat not present in the project area; 500-3000 ft.
Calystegia atriplicifolia ssp. buttensis - Butte County morning glory	S	No	Dry openings in low elevation westside mixed conifer or pine forests not present; 2000-4000 ft.
Campanula wilkinsiana - Wilkin's harebell	S	No	Higher elevation moist meadow or stream habitat moderately well-surveyed and species not found; 5900-8500 ft
Clarkia gracilis ssp. albicaulis- white-stemmed clarkia	S	No	Low elevation, westside foothill open areas not present; 500-3600 ft.
Clarkia stellata - Plumas clarkia	S	No	Habitat of openings in eastside mixed conifer not present; 3000-6000 ft.
Cypripedium fasciculatum - clustered lady's-slipper	S	Yes	Habitat of dry to moist, mid to late seral mixed conifer forest moderately well surveyed and species not found, but potential habitat exists within project area; 2000-6000 ft

Species	Status*	Considered	Reasons
Cypripedium montanum - mountain lady's-slipper	S	No	Habitat of moist mixed coniferous forest and riparian areas with high canopy cover, near Lake Britton not found within the project area; 2800-6000 ft.
Eriogonum prociduum - Prostrate buckwheat	S	No	Dry, rocky volcanic slopes, in eastside pine, juniper woodlands, or low sage not present; 4200-8200 ft.
Eriogonum spectabile - Barron's buckwheat	S	No	Glaciated andesite soil in open red fir/lodgepole forest not present; 6600-6640 ft.
Fritillaria eastwoodiae - Butte County fritillary	S	No	Lower westside mixed conifer or brushy areas not present; 100-4000 ft.
Iliamna bakeri - Baker's globe mallow	S	No	Habitat of eastside sagebrush, juniper woodland, or lava beds not present; 3200-8200 ft.
Juncus leiospermus var. leiospermus - Red Bluff dwarf rush	S	No	Lower westside vernal pool edges or seasonally wet flats not present in the project area. 175-3300 ft.
Lewisia cantelovii - Cantelow's lewisia	S	No	Wet granite cliffs and outcrops not present in project area; 1500-5000ft.
Limnanthes floccosa ssp. bellingeriana - Bellinger's meadowfoam	S	No	Seasonally wet areas in oak or oak/juniper woodlands below 3600 ft not present in the project area.
Lupinus dalesiae - Quincy lupine	S	No	Habitat of dry, often rocky slopes on slate soil in mixed conifers not present in the project area; 2500-6500 ft.
Meesia triquetra - Meesia moss	S	Yes	Species present
Mimulus evanescens - ephemeral monkeyflower	S	No	Habitat of seasonal lake margins or seasonally wet areas in sagebrush/juniper zone not present; 3900-5580 ft.
Monardella follettii - Follett's monardella	S	No	Serpentine soil not present; 4000-6500 ft.
Monardella stebbinsii - Stebbins' monardella	S	No	Serpentine soil not present; 2500-5000 ft.
Oreostemma elatum - Plumas aster	S	Yes	Habitat of westside fens or very wet meadows well surveyed and species not found, but potential habitat exists within the project area; 3500-6800 ft.
Penstemon personatus - closed-throated beardtongue	S	No	North-facing slopes in upper mixed conifer forest with a substantial red fir component not present; 4500-6500 ft.
Ptilidium californicum - California fuzzwort	S	No	Habitat of old-growth, mixed coniferous stands, or stands with legacy components, within the northwest portion of the Hat Creek RD not present.
Phacelia inundata - playa phacelia	S	No	Eastside subalkaline flats not present in project area; 5000-6600 ft.
Pogogyne floribunda - profuse-flowered pogogyne	S	No	Eastside vernal pool edges, reservoir edges, or seasonally wet flats not present; 3200-5000 ft.
Polygonun polygaloides ssp. Esotericum - Modoc County knotweed	S	No	Seasonally wet adobe flats and pond basins in sagebrush scrub and juniper woodland not present; 4900-5600 ft.
Rorippa columbiae - Columbia yellow cress	S	No	Large, open, seasonally wet eastside flats (playas) not present; 4000-5950 ft.
Rupertia hallii - Hall's rupertia	S	No	Openings in lower westside mixed conifer forest not present; restricted to Campbellville and Butte Meadows area (Almanor District) below 4500 ft.
Scheuchzeria palustris var.	S	No	Floating sphagnum bogs in cold, moderately high elevation

Species	Status*	Considered	Reasons
Americana - American scheuchzeria			lakes not present; 3000-9000 ft.
Sedum albomarginatum - Feather River stonecrop	S	No	Serpentine rock outcrops not present; 1000-5600 ft.
Senecio eurycephalus var. lewisrosei - cut-leaved ragwort	S	No	Serpentine soil not present; 1000-4600 ft.
Silene occidentalis ssp. longistipitata - long-stiped campion	S	Yes	Openings in mid-elevation mixed coniferous forests moderately well surveyed and species not found, but potential habitat exists within project area. 4500-6100 ft
Smilax jamesii - English Peak greenbrier	S	No	Restricted to alder thickets and bracken fern slopes north and west of Burney; 5000-8200 ft.

*Status: FE = Federally Endangered, FT = Federally Threatened, S = Forest Service Sensitive
Source: Lassen National Forest Botanist

Consultation To Date

A species list was obtained from the Sacramento Field Office of the United States Department of the Interior, Fish and Wildlife Service, dated August 22, 2005, that provides proposed and listed Endangered and Threatened species that may be present within the Lassen National Forest. Orcuttia tenuis, slender Orcutt grass, Tuctoria greenei, Green's tuctoria, and *Limnanthes floccose* ssp. *Californica*, Butte County meadowfoam are the only listed species whose range includes the Lassen National Forest (USDI F&WS, 2005). Critical habitat was also designated for these species including approximately 25,000 acres located within or adjacent to the boundaries of the Lassen National Forest (USDI F&WS, 2003). There are no known occurrences of these species within the Creeks Project area, and there is no vernal pool habitat required for these species. In addition, the project area also does not contain valley and foothill grasslands in Butte County which is required for *Limnanthes floccose* ssp. *Californica*. Therefore, no Threatened or Endangered species, or their associated critical habitat, occur within the project area, and a botanical Biological Assessment is not needed.

Sensitive Plants

All know occurrences of sensitive plants are shown on Figure 3-23.

Affected Environment

Three Sensitive plant species have been found in the project area: *Botrychium montanum* (western goblin), *B. minganense* (Mingan moonwort) and *Meesia triquetra* (meesia moss). *Botrychium montanum* is known to one occurrence within the project area at Milkhouse Flat. This occurrence was not relocated during recent surveys. *Botrychium minganense* is known to two locations; two individuals have recently been found at Milkhouse Flat, while the Little Grizzly Fen occurrence ranges between three and seven individuals. *Meesia triquetra* was previously known to four occurrences located within the project area, but an additional 13 occurrences were found during 2004 surveys. This species is now known to 17 occurrences within the project area, all within fen habitats. Although potential habitat exists for *Botrychium ascendens* (upswept moonwort), *Botrychium crenulatum* (scalloped moonwort), *Cypripedium fasciculatum* (clustered lady's slipper), *Oreostemma elatum* (Plumas aster) and *Silene occidentalis ssp. longistipitata* (long-stiped campion) none of these species have been found within the project area.

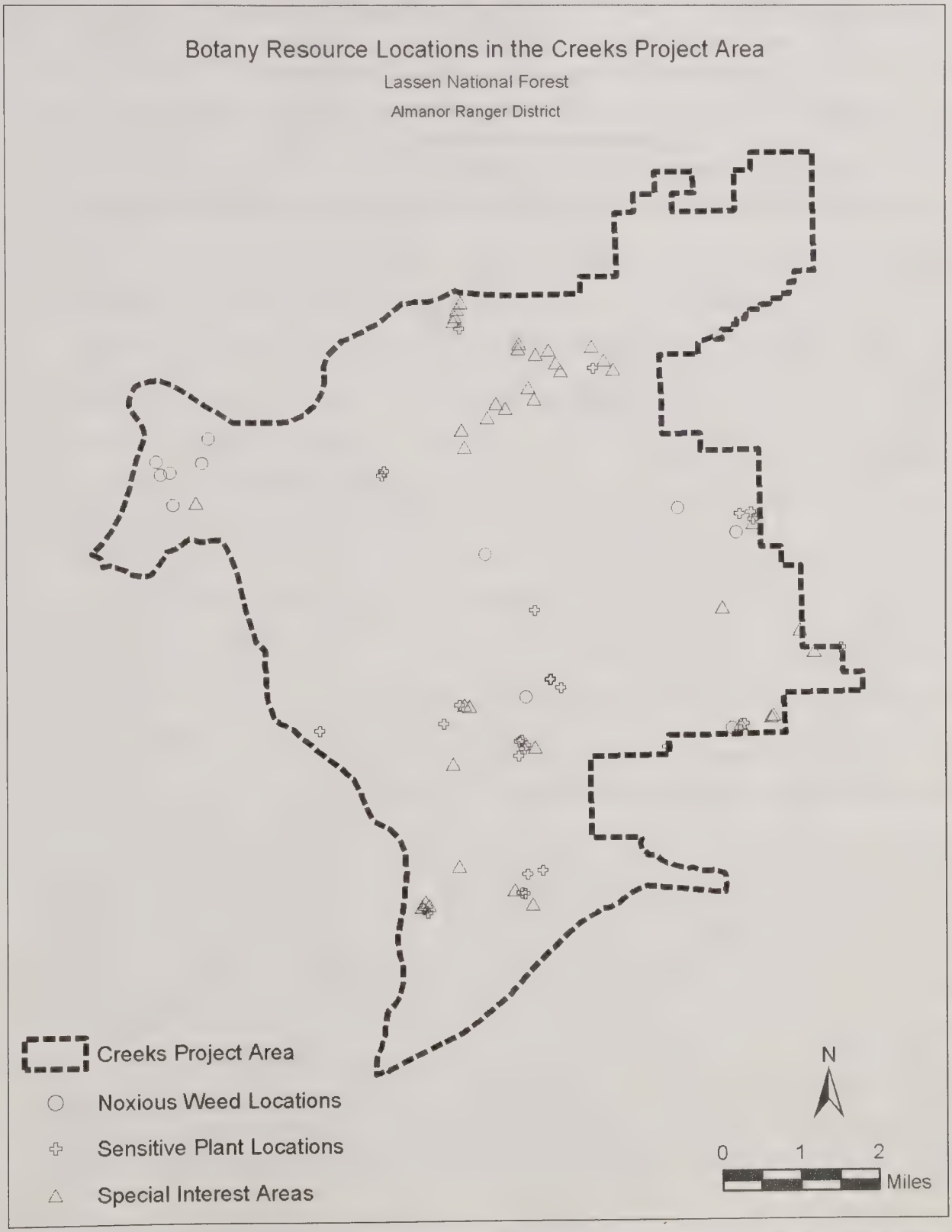
Botrychium ascendens is a small, primitive, perennial fern, that is normally found in wet meadows or riparian habitats in coniferous forests at elevations form 5,000 to 6,000 feet (USDA FS, 2005d; CNPS, 2001). *Botrychium ascendens* is widely distributed in Canada, Alaska, Montana, California, Nevada, Oregon, Wyoming, Idaho, and Washington, but is considered rare in many of these states (USDA FS, 2005d). Overall plant numbers within California are also low with only eight confirmed occurrences of *Botrychium ascendens* found in the state (USDA FS, 2005d). The Lassen National Forest has six occurrences, but only three have been recently located. In addition, the Tahoe National Forest has four confirmed occurrences, the Inyo has four unconfirmed occurrences, and the Modoc National Forest has one confirmed occurrence. There is also a historical occurrence reported at Camp Agassiz in the Lake Tahoe Region, which was not relocated during surveys in the summer of 2002 (USDA FS, 2005d). Most occurrences are known to Willow and Jones Creeks on the Almanor Ranger District. Unfortunately, three of these sites have not been relocated since their discovery in 1985. Wet areas throughout the project area were surveyed for all *Botrychium* species, but no occurrences of *Botrychium ascendens* were found. There is no formal monitoring in place for this species, and trends, long or short term, are unknown at this time.

Botrychium crenulatum, is a small, primitive, perennial fern, yellowish green in color, that is often associated with moist habitats in California including meadows, seeps and springs within coniferous forest habitats over 5,000 feet (CNPS, 2001). *Botrychium crenulatum* is limited to the western United States, where it is scattered from California to Montana. It has the widest distribution in California of all the rare *Botrychium spp.*, but is not known to be common anywhere, and most of the occurrences consist of only a few plants (USDA FS, 2005e). Currently, there are approximately 35 occurrences of this species within California, found in scattered locations from the San Bernardino to the Modoc National Forests and over to the Mendocino National Forest, where one occurrence has been found (USDA FS, 2005e). On the Lassen National Forest there are 11 known occurrences, 10 of which are on the Almanor Ranger District, on Willow, Jones and Martin Creeks. Wet areas throughout the project area were surveyed for all *Botrychium* species, but no occurrences of *Botrychium crenulatum* were found. There is no formal monitoring in place for this species, and trends, long or short term, are unknown at this time.

Botrychium minganense is a small, primitive, perennial fern, usually associated with riparian areas, small streams, or fens running throughout coniferous forests ranging from 5,000 to 6,000 feet in elevation (CNPS, 2001). *Botrychium minganense* is known to Butte, Fresno, Mono, Plumas, Tehama and Tulare Counties in California; and scattered locations throughout Arizona, Idaho, Nevada, Oregon, Utah, and Washington (USDA FS, 2005f). Currently, this species is known to California from only 15 confirmed occurrences, 11 are located within the Lassen National Forest, and one occurrence is known to each the Inyo, Modoc, Plumas and Sequoia National Forests (USDA FS, 2005f). In addition, there are also a few historical occurrences in Butte County, and a report from the Sequoia National Park (USDA FS, 2005f). Occurrences often consist of only a few plants so overall plant numbers in California are low. On the Lassen National Forest most are located within the Almanor Ranger District, but there is one occurrence on the Hat Creek Ranger District found on Upper Onion Creek near Cabin Springs. Within the Creeks Project area there are two known occurrences. One occurrence is known to Little Grizzly Fen, where it has been found to have between three and nine plants, and one occurrence is known to Milkhouse Flat where only two plants have been found during recent monitoring

visits. There is no formal monitoring in place for this species, and trends, long or short term, are unknown at this time.

Figure 3-23. Botany Resource Locations within the Creeks Project Area



Botrychium montanum is a small, primitive, perennial fern, found in varied wet habitats from marshes/meadows to coniferous forest/montane streamside areas, at elevations ranging from 5,000 to 6,000 feet (CNPS, 2001). *Botrychium montanum* occurs in scattered locations from British Columbia to Montana, California, Oregon, and Washington (CNPS, 2001). It is one of the rarest *Botrychium sp.* in California, with only nine confirmed occurrences in the state (USDA FS, 2005g). The Modoc National Forest has one occurrence while the Lassen National Forest has 11 occurrences but only seven confirmed occurrences have been located since 1985. In addition, there are a few historic occurrences, which have not been confirmed in recent years within Butte County. The occurrence at Milkhouse Flat is within the project area, but recent attempts to relocate the two plants originally found at this site were unsuccessful during the 2004 field season. There is no formal monitoring in place for this species, and trends, long or short term, are unknown at this time.

Cypripedium fasciculatum is a large distinctive flowering orchid, which has only two large oval leaves that grow close to the ground, and a cluster of greenish-yellow flowers with brown veins growing above (Hickman, 1993). In Oregon and California, *Cypripedium fasciculatum* is associated with Douglas-fir-dominated and mixed coniferous forests in the mid to late seral stages with many occurrences documented in riparian areas (USDA FS, 2005h). This species is known from the western states of California, Colorado, Idaho, Montana, Utah, Oregon, Washington, and Wyoming. In California it has been found only in the northern forests from Del Norte County to Sierra County on the Six Rivers, Shasta- Trinity, Klamath, Mendocino, Lassen, Plumas, and Tahoe National Forests (USDA FS, 2005h). The Lassen National Forest currently has only one known occurrence, found west of the project area near Butt Reservoir. Mixed coniferous habitats with a high canopy cover were surveyed throughout the project area but no occurrences of this species were found.

Meesia triquetra is a fairly large moss that grows in clumps within fen habitats. *Meesia triquetra* is found in bogs and fens, meadows and seeps, often in meadow openings surrounded by *Pinus contorta* from 5000 to 10,000 feet (herbarium specimens and CNPS, 2001). *Meesia triquetra* is known from North America, Europe and Asia, but is most abundant in arctic regions. The California Native Plant Society considers the species rare in California and more or less widespread outside of California (CNPS, 2001). California populations are known from Alpine, Butte, El Dorado, Fresno, Humboldt, Madera, Mariposa, Plumas, Sierra, Siskiyou and Tulare counties (herbarium specimens, CNPS, 2001). In California this species is known from approximately 74 occurrences, primarily within the Sierra Nevada (Dillingham, 2005). Two historic occurrences outside the Sierra Nevada may be extirpated (Dillingham, 2005). On the Lassen National Forest, this species is known from 25 occurrences, all within fens on the Almanor Ranger District. Of these 25 occurrences, 17 are found within the Creeks Project area.

Some historical occurrences may be extirpated, but most occurrences have been recently discovered due to increased survey efforts on the Sierra Nevada National Forests. Little population monitoring has occurred, so trends are not known.

Oreostemma elatum is a perennial herb in the sunflower family with a solitary purple flower that is known only to wet meadows, fens and seeps within upper montane coniferous forests in Plumas County (Hickman, 1993; USDA FS, 2005i). Currently, this species is known only to nine occurrences on the Plumas National Forest and adjacent private lands (USDA FS, 2005i). No occurrences have been found on Lassen National

Forest lands despite the presence of potential habitat. All fens and wet habitats were surveyed within the project but no occurrences of this species were found.

The trend for this species is presently unknown. Monitoring of occurrences on the Plumas National Forest did not begin until 1997, but additional monitoring information is needed in order to determine long-term trends (USDA FS, 2005i).

Silene occidentalis ssp. longistipitata is a fairly large campion with unusually long (to 1.5 inches) pink to rose colored petals that grows in the openings of mid-elevation mixed coniferous forests (Hickman, 1993). The historic range of *Silene occidentalis ssp. longistipitata* is from northeastern Shasta County (one site at Goose Valley) to eastern Tehama County, northern Butte County, and northwest Plumas County, but many of these occurrences have not been relocated since their discovery (USDA FS, 2005j). Currently, there are eight occurrences known on the Lassen National Forest, one of which may be extirpated, and two occurrences are known to adjacent private lands. Potential habitat within the project area was surveyed but no occurrences of this species were located.

Very little monitoring has occurred for these species, but of the ten recently documented occurrences, one may be extirpated and three others had less than three plants when last monitored. Most other occurrences are small (<200 plants) (USDA FS, 2005j).

Environmental Effects

Alternative 1 - Proposed Action

Direct Effects to Sensitive Plants

Direct effects involve physical damage to the plants or their habitat, such as crushing, breaking, or burning the plants; burying them under displaced slash or duff; or disturbing/compacting the soil. Such damage can kill the plants. With the implementation of the Integrated Design Features in the Proposed Action, no direct effects to *Meesia triquetra*, *Botrychium minganense* or *B. montanum* are expected. All known occurrences would be flagged and avoided, and the fens that *Meesia triquetra* and *Botrychium minganense* occur in would receive a 150 ft buffer as part of the Integrated Design Features for wet meadows (fens), so no direct effects to associated fen habitats are expected. In addition, occurrences of *Botrychium minganense* and *B. montanum* at Milkhouse Flat are found outside of proposed treatment units, and therefore would not be impacted by the Creeks Forest Health Recovery project.

Since no known occurrences of *Oreostemma elatum* were found in the project area, and all potential fen habitat within the project area would receive a 150 foot buffer as part of Integrated Design Features for wet meadows (fens), there would be no direct effects to potential habitat for this species from the Creeks Project.

Potential habitat for *Botrychium ascendens*, *Botrychium crenulatum*, *Botrychium minganense*, *Botrychium montanum, Cypripedium fasciculatum* and *Silene occidentalis ssp. longistipitata* exists within the project area and may be treated under the Proposed Action alternative without detrimental effects to the viability of the species. Although adequate botanical surveys have been preformed in the project area, with the exception of *Botrychium montanum* and *B. minganense*, no occurrences were found of these species, but it is possible that isolated individuals may have been missed. Therefore, any undiscovered individuals may be impacted inadvertently, but any effects are expected to be minimal. However, if new occurrences of these species are found before or during ground disturbing activities, they would be protected by flag and avoid methods as

stated in the Integrated Design Features for the Proposed Action. While these species are being analyzed as having potential habitat within the project area, there is no definitive knowledge of why these species were not found during surveys. Only general assumptions about habitat needs are discussed in regard to these species since not enough is understood about the specific habitat requirements for a detailed discussion of project level effects.

Indirect Effects to Sensitive Plants

Indirect effects (either positive or negative) may indirectly impact these species by changing local hydrological patterns in sensitive plant habitat, by changing the fire regime or vegetation structure of the habitat, or can occur from the future threat of noxious weed invasion. There will be no indirect effects to *Meesia triquetra* or *Oreostemma elatum* since these species and their habitat are protected from indirect project activities by the Integrated Design Feature of a 150 ft. buffer for wet meadows (fens) within the project area. In addition, since fens tend to be saturated and nutrient poor, these systems do not seem to be suitable for noxious weeds, so the threat of future invasion is not a concern within fen habitats. Finally, the saturated nature of these habitats prevents them from burning so there will be no impacts to these habitats from severe wildfire.

Changing local hydrological patterns

Possible indirect effects to *Botrychium ascendens, B. crenulatum, B. minganense* or *B. montanum* could occur if the hydrology or nutrient input of associated fens, meadows, springs or streams were to be altered during project activities. These species tend to be found within the inner zones of riparian areas, which will for the most part be protected by RHCA buffers. Incidental impacts may occur to seep/spring areas that may have been missed during surveys, but these areas should be few and any impacts to potential habitat should not be detrimental to the species. Activities occurring upslope of fens, such as timber harvest or road cuts, could alter the hydrology of fens, but Integrated Design Features for wet meadow (fen) habitats were created specifically for these habitats within the project area to ensure that these effects do not occur.

Fire regime of the habitat

The Proposed Action could also have beneficial indirect effects to the potential habitat of all *Botrychium spp.* and *Cypripedium fasciculatum*, since thinning the forest and reducing woody fuels in the project area could help maintain populations of these species and their habitat by reducing the severity of a potential wildfire. High intensity fire has been shown to be detrimental to both *Botrychium spp.* (Johnson-Groh and Farrar, 1996) and *Cypripedium fasciculatum* occurrences (USDA FS, 2005h), though the effect fire has on *Silene occidentalis ssp. longistipitata* is unknown at this time.

Changing the vegetation structure

For most species the change in vegetation structure will not affect them. Since *Botrychium ssp.* are mycorrhizal they can grow in a variety of habitats so the removal of trees and opening of the canopy should not be detrimental. For species such as *Cypripedium fasciculatum* and *Silene occidentalis ssp. longistipitata*, these species both require partially shaded conditions, so group selection harvest would be more harmful to potential habitat than DFPZ construction or area thinning prescriptions within the project area. Both DFPZ and area thinning prescriptions will function to open up the canopy, provide gaps and increase the sunlight required by these species (USDA FS, 2005h; USDA FS, 2005j).

Future threat of noxious weed invasion

Another potential indirect effect is an increase in noxious weeds or other undesirable non-native species as a result of project activities. Three species of California Department of Food and Agriculture listed noxious weed species are known to occur in the Creeks Project area, but most are located within RHCA inner zones, and therefore would not be impacted by project activities. Thinning and burning create open microsite (and sometimes macrosite) habitats of reduced shade and soil cover, making conditions for noxious weed establishment favorable, and since these species are often more aggressive than the natives, they can quickly dominate a site. Increased weeds in logged and burned areas may compete with Sensitive plants and other desirable species, making the habitat less suitable for the desirable plants. This risk is highest within group selection units where the canopy cover will be lowest and the ground disturbance highest. The Noxious Weed Risk Assessment completed for this project determined an overall moderate risk of potential weed spread with the implementation of the Proposed Action (Appendix B). The standard practice of equipment cleaning and Integrated Design Features of avoiding or treating noxious weed infestations within the project area, particularly those located outside of RHCA inner zones, would reduce these potential effects.

Cumulative Effects to Sensitive Plants

With the implementation of the Integrated Design Features, little or no direct or indirect effects are expected for *Meesia triquetra* or *Oreostemma elatum*. Therefore, cumulative effects are not a concern for these species from the Creeks Forest Health Recovery project. The project area was chosen as the cumulative effects analysis area for the remaining species due to the Integrated Design Feature of flag and avoidance for known sites, and the lack of knowledge of specific habitat requirement for these species. While *Botrychium ascendens, B. crenulatum, B. minganense, B. montanum, Cypripedium fasciculatum,* and *Silene occidentalis ssp. longistipitata*, are being analyzed for having potential habitat within the project area, there is no definitive knowledge of why these species were or were not found during surveys. Only general assumptions about habitat needs are analyzed in regard to these species, since not enough is understood about the specific habitat requirements for a detailed discussion of project level effects.

Past vegetation management actions (Appendix A) within the Creeks Project area have resulted in a variety of disturbances across the landscape. Prior to 1989, botanical surveys for Lassen National Forest projects were not conducted as intensively as project surveys are today, due to the lack of a Forest Botanist on the Forest. In addition, periodic changes to the Regional Sensitive plant list and the ever increasing knowledge of rare species and their habitat means that surveys today are more thorough than those conducted in the past. Finally, many species of concern today are very small in stature and are easily overlooked during surveys. Therefore, it's possible that isolated populations were overlooked during surveys. For all of these reasons, past vegetation projects may have potentially had direct and indirect effects to Sensitive plants and their potential habitat within the project area. Though many of the species known to the project area such as *Botrychium ssp.* are associated with either riparian areas or fen habitats. It can therefore be assumed that impacts have been minimal to these species from past projects due protection measures for riparian areas. Overall, there is no way to determine what impact past activities have or have not had on each species and their potential habitat, due to a lack of historic knowledge and detailed habitat requirements for these species. It's very possible that those species that were not located during surveys have never existed within the project area due to a missing habitat requirement that has not yet been determined.

Past vegetation treatments on private lands many also have had cumulative impacts to Sensitive plant species, but since survey requirements and mitigations for known occurrences are not known, the type and extent of the impact to these species or their potential habitat can not be quantified.

Ongoing vegetation management actions, special uses and recreation projects on the District (Appendix A) were surveyed to similar standards as the Creeks Project. As with the Creeks Project, all projects were adequately surveyed and known occurrences of Sensitive plant species were flagged and avoided, but impacts may occur to potential habitat. Ongoing private actions as with past treatments may also have had cumulative impacts to Sensitive plant species, but since survey requirements and mitigations for known occurrences are not known, the type and extent of the impact to these species or their potential habitat can not be quantified.

Ongoing range management activities could also have potential effects on all these species. Fen habitats can be significantly impacted by moderate to heavy use and trampling by cattle, and will begin to lose carbon due to decreased plant production and increased rates of respiration (Cooper et al., 2004). Fens with a negative carbon balance are in jeopardy of losing their peat body and as a result the fen ecosystem could be degraded or lost (Cooper et al., 2004), which could in turn affect fens species. In addition, Botrychium ssp. are susceptible to impacts by livestock especially along streams where plants growing along the banks can be damaged and their habitat destroyed by trampling. Both *Silene occidentalis* ssp. *longistipitata* and *Cypripedium fasciculatum* can both be trampled and browsed by cattle, which could add cumulatively to impacts to their potential habitat caused from the Proposed Action.

Other ongoing actions within the project area such as ongoing road maintenance, Christmas tree permits, woodcutting, mining operations, and the various recreation activities within the project area may have contributed only incidental effects on these species, if any.

Future actions will have similar effects to Sensitive plants as the Creeks Project since all projects have either been surveyed to similar standards as the Creeks Project or will be prior to project implementation, and known sites of all the potential species discussed in this document will be flagged and avoided by project activities.

Noxious weed invasion on Sensitive Plants

Effects from past Forest Service vegetation management activities on noxious weeds within the project area do not seem to have been to detrimental to known Sensitive plant occurrences or potential habitat. At this time there are no known Sensitive plant occurrences threatened by noxious weeds. Canada thistle, which is primarily found at wetter sites has only been found within the project area growing in streamside riparian areas or along disturbed roadsides. This species does not seem to be able to enter fens where nutrients are scarce, and has not yet been found within seepy areas or small creek sides where the canopy cover is high and *Botrychium ssp.* tend to be found. Gap areas should be the most vulnerable to invasion but at this time, but no weeds have been found growing with or near any known occurrences of *Silene occidentalis ssp. longistipitata* on the forest. Cumulative effects from project-related noxious weed introduction (and subsequent spread) are few, and Integrated Design Features reduce this potential substantially. Habitat vulnerability within the project area was determined to be low due to the current high canopy cover and the relative small amount of known weeds within the project area (Appendix B). Previous disturbances from controlled burns, roads and logging could result in at least moderately vulnerable habitat for noxious weed spread if noxious weeds are introduced into the area, and could contribute cumulatively to noxious weed increase and potential effects on TES plant

habitat across the Forest. Since noxious weed mitigations and surveys on private lands are unknown, the effect of past private lands actions is uncertain, but there are no known large weed infestations found on private lands within or adjacent to the project area.

Ongoing Forest Service vegetation actions within the project area will add cumulative to the Proposed Action by disturbing even more ground and opening up the canopy to those species which require full sun. Integrated Design Features were developed to reduce these effects on Forest Service lands and post project monitoring will ensure that new occurrences are treated before they become established and spread into the project area. Once again it is unknown what noxious weed mitigations and treatments are being implemented for ongoing vegetation treatments on private lands, but without any known large infestation of weeds on private lands within the project area, then cumulative effects from private land vegetation treatments should be minor.

Ongoing grazing and road maintenance programs could have the potential to add to the cumulative effects from the Proposed Action. The Noxious Weed Risk Assessment for the Creeks project determined that there was a low to moderate currently vulnerability from existing non-project related vectors within the project area (Appendix B). Existing vectors within the project area include both livestock and roads. Since there are relatively few active cattle allotments within the project area, and since cattle are not known to graze on Canada thistle, the most common species within the project area, then livestock is probably not a major vector for noxious weed spread within the project area. The ongoing road maintenance program, however, probably has contributed to noxious weed spread within the project area. Currently, all known noxious weed occurrences along roads within the project area are under treatment, but there is still the potential for road maintenance equipment to bring new weed infestations into the project area. Integrated Design Features of post-project monitoring and treatment were developed to lower the risk from potential vectors within the project area. Therefore, there should be no added cumulative effects to the Proposed Action from the ongoing grazing and road maintenance programs

Finally ongoing programs such as special uses, Christmas tree permits, woodcutting and various recreation programs should add little to the overall cumulative effects. Once again the Integrated Design Feature of post-project monitoring should detect any new occurrences, whether project related or from some other ongoing action, and treatment will control any new infestation before they become established within the project area.

Future Actions within the project area have or will have similar noxious weed surveys as the Creeks project. Integrated Design Features found within the Creeks project are standard in most projects on the Forest, and additional ones may be added on a site-specific basis if needed. At this time, there are few known noxious weed occurrences found within any of the foreseeable future projects (Appendix A). The Willow project as the potential to disturb large areas of forest, but at this time there are only a few known noxious weed occurrences within the project area and all are currently being treated. The Noxious Weed Risk Assessment for the Creek Project determined that their was a moderate risk of increase weeds spread by the implantation of the Proposed Action (Appendix B) but Integrated Design Features were developed to lower this risk and ensure that new occurrences do not become established.

In conclusion, the Proposed Action for the Creek Forest Health Recovery Project will treat approximately 10,435 acres through a variety of methods across the landscape. These actions, while avoiding impacts to all known occurrences of Sensitive plant species, may have effects to potential habitat for *Botrychium ascendens,*

B. crenulatum, B. minganense, B. montanum, Cypripedium fasciculatum and *Silene occidentalis ssp. longistipitata* and may add cumulatively to past, ongoing and future actions discussed within the project area. Any impacts to potential habitat within the project area should not be detrimental to the viability of these species within the project area.

Alternative 2 - No Action

Direct Effects to Sensitive Plants

There would be no direct effects to *Botrychium ascendens, B. crenulatum, B. minganense, B. montanum, Cypripedium fasciculatum, Meesia triquetra, Oreostemma elatum* or *Silene occidentalis* ssp. *longistipitata* from the No Action Alternative other than those associated with current ongoing activities.

Indirect Effects to Sensitive Plants

Indirect effects of no action would be those associated with continued habitat succession, ongoing activities, the current and future threats of noxious weed infestations and the threat of wildfire. The Noxious Weed Risk Assessment for the Creeks Forest Health Recovery Project (Appendix B) determined that there was a low current habitat vulnerability and low to moderate non-project dependant vectors associated with the project area, in the absence of the Proposed Action. In addition, since all treatable occurrences of noxious weeds within the project area would be treated regardless of the alternative chosen, increased threat from noxious weeds with the implementation of the No Action is not and issue. Continued habitat succession by the forest would also not affect *Botrychium* spp., since *Botrychiums* are mycorrhizal and can be found in variety of timber types to open meadows (Laeger, 2002). This is true also for the fen habitats where *Meesia triquetra, Oreostemma elatum* and at times *Botrychium* spp. can be found since trees, which may encroach into these systems over time are common, and many times are required to sustain these systems. The No Action Alternative may have negative impacts to potential habitat for *Silene occidentalis* ssp. *longistipitat*a and *Cypripedium fasciculatum*, which typically grow in partially shaded conditions within mixed coniferous forests.

Finally, it is impossible to determine where, when and how a wildfire may enter an area, thus predicting the effects of wildfire to Sensitive plant populations is unpredictable. Many times the effects of fire suppression can have larger effects to Sensitive plants and their habitat than the wildfire itself, but actual effects to Sensitive species depends on fire timing and intensity. With the No Action alternative, stands would not be thinned. As a result both ladder and surface fuels would continue to increase over time, leading to an increase in the risk of a high intensity wildfire. Although *Botrychium* spp. appear able to survive a low to moderate intensity fire that does not kill mycorrhizal soil fungi (Johnson-Groh, 1995), a high intensity fire could heat the soil enough to kill *Botrychium* plants and/or mycorrhizal fungi (Johnson-Groh and Farrar, 1996). Due to the loss of stabilizing vegetation and duff, hydrological changes and increased erosion could also follow a high intensity fire. Such changes could destroy *Botrychium spp.* habitat, as well as habitat for *Cypripedium fasciculatum* and *Silene occidentalis* ssp. *longistipitat*a. *Cypripedium fasciculatum* occurrences have been shown to be negatively impacted by fires, especially when the duff layer and canopy are removed (USDA FS, 2005h). While not much is known about fire effects on *Silene occidentalis* ssp. *longistipitat*a, one occurrence has been found within an old fire, but plants were found only under residual trees, and it is not known how many plants existed prior to the fire and logging operations. Due to this species preference for

partially shaded conditions, it can be assumed that a stand replacing fire would have the potential to negatively impact this species and its potential habitat. *Meesia triquetra* and *Oreostemma elatum* plants and habitat are not likely to be affected by a high intensity fire because they occur in open, saturated fen habitats that would not burn.

Cumulative Effects to Sensitive Plants

As with Alternative 1, the project area was chosen as the cumulative effects analysis area for Sensitive species for the No Action Alternative. Cumulative effects for past, ongoing and foreseeable future actions for the No Action Alternative will be identical to those previously discussed within Alternative 1. Unlike Alternative 1 though, there will be no direct effects and only few indirect effects to potential habitat for *Botrychium ascendens, B. crenulatum, B. minganense, B. montanum, Cypripedium fasciculatum* and *Silene occidentalis* ssp. *longistipitata* by the implementation of the No Action Alternative. As a result, there will be no new impacts to these species when added cumulatively to past, ongoing, and future actions by the selection of the No Action Alternative.

Alternative 14

Direct Effects to Sensitive Plants

There will be no effects to known occurrences of *Botrychium minganense, B. montanum* or *Meesia triquetra* due to the Integrated Design Feature of flag and avoidance for known occurrences. In addition, there will be no effects to potential habitat for *Meesia triquetra* or *Oreostemma elauma* due to the Integrated Design Feature of 150 ft. buffers around all wet meadow (fens). Direct effects from Alternative 14 to potential habitat for *Botrychium ascendens, B. crenulatum, B. minganense, B. montanum, Cypripedium fasciculatum* and *Silene occidentalis* ssp. *longistipitata* will be similar to those described in the Alternative 1, except there will be fewer impacts due to the reduction in the number of group selection treatment units for this Alternative.

Indirect Effects to Sensitive Plants

Indirect effects by the implementation of Alternative 14 will be similar to the effects discussion for Alternative 1 for all species. There will be fewer impacts to potential habitat for *Cypripedium fasciculatum* and *Silene occidentalis* ssp. *longistipitata* from the selection of Alternative 14 than those described in Alternative 1, due to the decrease in group selection treatment units. In addition, there may also be slightly less risk of spreading noxious weeds within the implementation of Alternative 14, also due to the decrease in group selection treatment units within the project area.

Cumulative Effects to Sensitive Plants

Once again the project area was chosen as the cumulative effects analysis area for Sensitive species for Alternative 14, due to the Integrated Design Feature of flag and avoidance for known sites, and the lack of knowledge of specific habitat requirement for these species. Cumulative effects for past, ongoing and foreseeable future actions for Alternative 14 will be identical to those previously discussed within Alternative 1. As with Alternative 1, there will be no direct effects to known occurrences of Sensitive species known to the project area, but there may be some effects to potential habitat for *Botrychium ascendens, B. crenulatum, B. minganense, B. montanum, Cypripedium fasciculatum* or *Silene occidentalis* ssp. *longistipitata* from the implementation of Alternative 14. These impacts and may add cumulatively to past, ongoing and future

actions discussed within the project area. Impacts to potential habitat from the implementation of Alternative 14 though should be smaller than those described within Alternative 1, due to the decrease in group selection units, but these impacts should not be detrimental to the viability of these species within the project area.

Determinations for Sensitive Plant Species

With implementation of project integrated design features, including 150-foot buffers around all know fens in the project area, the Creeks Project will not affect *Oreostemma elatum* or *Meesia triquetra* since no adverse direct, indirect, or consequent cumulative effects will occur. The Creeks Project may affect individuals of *Botrychium ascendens, B. crenulatum, B. minganense, B. montanum, Cypripedium fasciculatum* or *Silene occidentalis* ssp. *longistipitata* but is not likely to result in a trend toward federal listing as threatened or endangered or loss of viability fore these species.

Special Interest Plants

All know occurrences of special interest plants are shown on Figure 3-23.

Affected Environment

The following summarizes the species description, habitat, and distribution information for Special Interest plants species known from the project area:

Betula pumila var. glandulifera, bog birch or resin birch, is a medium-sized shrub up to 7 feet tall with grey-brown, non-peeling bark. *Betula pumila var. glandulifera* is associated with poorly drained riparian habitats, such as wet meadows, seeps, fens, and marshes. It is widely distributed in boreal North America and ranges south in the Pacific Northwest to northern California. In California it is known from Butte, Lassen, Modoc, Plumas, Siskiyou, and Tehama counties, at elevations of 4,000 to 7,500 feet (CNPS, 2001). On the Lassen National Forest, bog birch occurs at one site on the Eagle Lake Ranger District and two on the Almanor Ranger District, both within the Creeks Project area: a fen at Mudhole Hollow; and a wet meadow near the junction of Shanghai and Butt creeks.

Botrychium simplex, Yosemite moonwort, is a primitive fern-like herb up to 5 inches tall. *Botrychium simplex* is associated with moist streamsides, seeps, and wet meadows at elevations of 5,000 to 11,200 feet (USDA FS, 2003a). It is distributed across northern North America, and is disjunct in Europe and Japan. In California it is known from the North Coast Range, Cascade Range, Sierra Nevada, and San Bernardino Mountains (Hickman, 1993). Seven occurrences of Yosemite moonwort have been found on the Lassen National Forest: two on the Hat Creek Ranger District and five on the Almanor Ranger District, including two in the project area, at Milkhouse Flat and along L-T Creek. Both of these sites have experienced heavy cattle grazing in recent years, and the occurrences were not relocated during 2004 field surveys.

Claytonia palustris, marsh claytonia, is a perennial herb. *Claytonia palustris* grows in marshes, wet meadows, and seep areas at 3200-8200 feet (CNPS, 2001). It flowers from June to August, and generally must be in flower to identify. *Claytonia palustris* is endemic to California, where it occurs in Butte, Fresno, Plumas, Siskiyou, Tehama, and Tulare counties (CNPS, 2001). On the Lassen National Forest it is known from 22 occurrences on the Almanor Ranger District in the vicinity of Jonesville, Butt Creek, and Mineral. An extensive occurrence is known from the project area. It is distributed along the lower three miles of Shanghai

Creek and a five-mile section of Butt Creek around its confluence with Shanghai Creek, where it occurs on streambanks and in wet meadows and seepy areas.

Drosera anglica, English sundew, is a small insectivorous perennial found in wet meadows, fens, and swamps. The species can hybridize with *Drosera rotundifolia. Drosera anglica* is circumboreal; in California it ranges from the Klamath Range to the northern Sierra Nevada, at elevations of 4,200 to 6.500 feet (Hickman, 1993). Seven occurrences of English sundew are known on the Lassen National Forest, all in fens on the Almanor Ranger District. Two of these occurrences are in the project area at the Big Springs and Humbug Fens.

Penstemon heterodoxus var. shastensis, Shasta beardtongue, is a perennial herb. Its habitat is seasonally wet meadows or edges in coniferous forests. It flowers from June to August, and must be in flower to identify. *Penstemon heterodoxus var. shastensis* is endemic to elevations of 3,500 to 8,000 feet in the Cascade Range of northeastern California (CNPS, 2001). It is known from 15 widely scattered occurrences on the Lassen National Forest, including one site in the project area along Sawmill Tom Creek.

Stellaria obtusa, obtuse starwort, is a slender, prostrate perennial. It grows in moist soil in montane coniferous forests and riparian areas at elevations of 500 to 7,000 feet. It flowers from June to September. *Stellaria obtusa* is widely distributed in the Pacific Northwest and northern California (CNPS, 2001). On the Lassen National Forest it is known from 35 occurrences, all but two of them on the Almanor Ranger District. Nine occurrences are known from the project area: three in the L-T Creek drainage; two in the Water Creek drainage; and one each along Butte, Rock, Miller, and Sawmill Tom Creeks. All occurrences in the project area are in riparian areas.

Environmental Effects

Alternative 1 - Proposed Action

Direct Effects to Special Interest Plants

With the implementation of the Integrated Design Features in the Proposed Action, no direct effects to *Betula pumila* var. *glandulifera*, *Botrychium simplex* or *Drosera anglica* are expected. All known occurrences of *Botrychium simplex* and *Drosera anglica* would be flagged and avoided and the fens where *Drosera anglica* and *Betula pumila* var. *glandulifera* occur would receive a 150 ft buffer as part of the Integrated Design Features for wet meadows (fens), so effects to associated fen habitats are not expected. In addition, all occurrences of *Botrychium simplex* and *Betula pumila* var. *glandulifera* are found either within riparian areas, which would be protected by RHCA buffer zones, or are located outside of proposed treatment units. Therefore, there would be no direct effects from the implementation of the Creeks Forest Health Recovery Project to these species.

There would be some direct effects to *Claytonia palustris* from the implementation of the Creeks project. The *Claytonia palustris* occurrence in the project area consists of several hundred plants at 19 widely scattered sites, of which 12 are located within DFPZs along Shanghai and Butt creeks. Most of these sites are near surface water and would be adequately protected within RHCAs. However, several *Claytonia palustris* sites in the project area may be found outside of the inner zone of the RHCA, including three sites near proposed group selection units. Selective logging and slash treatment is allowed in some RHCAs, primarily in the outer zones. *Claytonia palustris* plants would be impacted and could be destroyed if driven on by logging

machinery, or if logs are skidded across them. Broadcast burning is also allowed in DFPZs, including RHCAs. Broadcast burning could kill *Claytonia palustris* plants, although prescribed fire in the moist habitat where this species occurs is likely to be patchy and low intensity, and would not impact many plants. Considering the extent of the species across the project area, any impacts to these isolated occurrences would be acceptable.

The only known occurrence of *Penstemon heterodoxus* var. *shastensis* in the project area is along Sawmill Tom Creek in a RHCA. The plants were found in a narrow riparian strip within the inner protection zone of the RHCA where project activities are limited to allowing prescribed fire to back into the zone and for the selective removal of trees without use of machinery. Therefore, few, if any, *Penstemon heterodoxus* var. *shastensis* plants would be impacted by such activities.

Nine occurrences of *Stellaria obtusa* are known from the project area. Four occurrences are found outside of proposed project units and would not be affected by project activities; the others are along stream channels within the inner protection zones of RHCAs. Therefore, project effects on *Stellaria obtusa* would be similar to those discussed for *Penstemon heterodoxus* var. *shastensis* and will probably be minimal.

Indirect Effects Direct Effects to Special Interest Plants

With the implementation of the Integrated Design Features in the Proposed Action, no indirect effects to *Betula pumila* var. *glandulifera*, *Botrychium simplex* or *Drosera anglica* are expected. All known occurrences of *Botrychium simplex* and *Drosera anglica* would be flagged and avoided and the fens where *Drosera anglica* and *Betula pumila* var. *glandulifera* occur would receive a 150 ft buffer as part of the Integrated Design Features for wet meadows (fens), so effects to associated fen habitats are not expected. In addition, all occurrences of *Botrychium simplex* and *Betula pumila* var. *glandulifera* are found either within riparian areas, which would be protected by RHCA buffer zones, or are located outside of proposed treatment units.

Changing local hydrological patterns

Possible indirect effects to *Claytonia palustris*, *Penstemon heterodoxus* var. *shastensis* and *Stellaria obtusa* could occur if the hydrology of associated meadows, seeps or springs were to be altered during project activities. Potential changes to local hydrologic patterns for these species would be similar to the indirect effects discussion for Sensitive Plants in Alternative 1.

Changing the fire regime of the habitat.

Implementation of Alternative 1 could also have beneficial indirect effects to *Claytonia palustris*, *Penstemon heterodoxus* var. *shastensis* and *Stellaria obtusa* plants, since thinning the forest and reducing woody fuels in the project area could help maintain populations of these species and their habitat by reducing the severity of a potential wildfire. A high intensity wildfire could kill individuals of *Claytonia palustris*, *Penstemon heterodoxus* var. *shastensis* and *Stellaria obtusa* plants and drastically alter their habitat. Thus, reducing the severity of a catastrophic wildfire, through the creation of DFPZ and area thinning treatments could help to maintain these species and their habitat in the project area.

Changing the vegetation structure

If log skidding or broadcast burning does not impact individuals of *Claytonia palustris, Penstemon heterodoxus* var. *shastensis* or *Stellaria obtusa*, the plants may receive a beneficial effect from proposed thinning of the canopy in DFPZ and area thinning units. Thinning of the canopy in these areas could

potentially allow more light to reach the forest floor, which in turn could provide a more suitable environment for these species within existing overstocked stands.

Future threat of noxious weed invasion

Soil disturbance from project implementation would create conditions more favorable to noxious weed dispersal and establishment in the project area. Noxious weeds could directly compete with *Claytonia palustris*, *Penstemon heterodoxus* var. *shastensis* and *Stellaria obtusa* plants and/or decrease habitat quality for these species. The Noxious Weed Risk Assessment completed for this project determined an overall moderate risk of potential weed spread with the implementation of the Proposed Action (Appendix B). Project Integrated Design Features for noxious weeds would minimize the risk of weed establishment in the project area.

Cumulative Effects to Special Interest Plants

With the implementation of the Integrated Design Features, no direct or indirect effects to *Betula pumila* var. *glandulifera*, *Botrychium simplex* or *Drosera anglica* are expected. Therefore, cumulative effects are not a concern for these species from the Creeks Forest Health Recovery project. The project boundary was chosen as the cumulative effects analysis area for the remaining species due to the lack of knowledge of specific habitat requirement for these species, or their historic range within the project area.

Past

Past vegetation treatments within the Creeks Project area have resulted in a variety of disturbances across the landscape (Appendix A). Since *Penstemon shastensis* var. *heterodoxus* is known to riparian areas within the project area, it can be assumed that the impacts to this species have been minimal in the past, due to past riparian protection measures. Past treatments, however, may have had a beneficial impact to those species, which may respond favorably to the opening of the canopy such as *Claytonia palustris* and *Stellaria obtusa*. Any effects though would have depended on the prescriptions used for timber harvest operations, and the historic range of these species is unknown, so actual effects are impossible to quantify. Additional impacts from past vegetation management activities on Forest Service and private lands would be similar to those discussed within the cumulative effects analysis for Sensitive plant species in Alternative 1.

Effects from past Forest Service and private vegetation management activities on noxious weed invasion within the project area do not seem to have been detrimental to known Special Interest plant species. At this time, there are no known Special Interest plant occurrences threatened by noxious weed invasion. Therefore, effects discussion on Species Interest plant species and noxious weed invasion are similar to the Alternative 1, cumulative effects discussion for Sensitive plants.

Ongoing

Ongoing vegetation management actions, special uses and recreation projects on the District (Appendix A) were surveyed to similar standards as the Creeks Project. As with the Creeks Project, all projects were adequately surveyed and known occurrences of Special Interest plant species in which the viability was a concern were either avoided, or design features were created to minimize the impacts to these species by project activities. As with Sensitive species, ongoing private actions may also have had cumulative impacts to Special Interest Plant species, but since survey requirements and mitigations for known occurrences are not known, the type and extent of any impacts to these species or their potential habitat can not be quantified.

Other projects, such as the ongoing range management program, could have a potential effect on the larger species such as *Penstemon shastensis* var. *heterodoxus*, which may be grazed by cattle within the project area. Smaller species such as *Claytonia palustris* and *Stellaria obtusa* would probably only receive impacts from incidental trampling by livestock, since these species have a prostrate growth habitat and are therefore not actively grazed.

Other ongoing actions within the project area such as ongoing road maintenance, Christmas tree permits, woodcutting, mining operations, and the various recreation activities within the project area may have contributed only incidental effects on these species, if any.

The effects from ongoing Forest Service and private vegetation management actions as well as other ongoing activities on increasing noxious weed within the project area would be similar to those effects described in the Alternative 1, cumulative effects discussion for Sensitive plants.

Foreseeable Future Actions

Foreseeable future actions will have similar effects to Special Interest plants as the Creeks Project. All projects have either been surveyed to similar standards as the Creeks Project or will be prior to project implementation, and known sites of all potential species in which the viability may be concern would either be avoided or design features would be created to minimize the impacts to these species by project activities. The effects from future Forest Service actions on increasing noxious weeds would be similar to those effects described in the Alternative 1, cumulative effects discussion for Sensitive plants.

In conclusion, currently there is only one known occurrence of *Claytonia palustris* found within the project area, but plants from this occurrence were found in 19 scattered locations along Shanghai and Butt Creeks. In addition, many more plants were probably missed during survey efforts within these drainages. Since this species is not rare within the project area, then the implementation of Alternative 1 should not effect the viability of this species even when added cumulatively to past, ongoing and future impacts within the project area. Potential cumulative effects by the implementation of Alternative 1 are similar for *Penstemon heterodoxus* var. *shastensis* and *Stellaria obtusa*, since impacts to these species are expected to be minimal. Overall, both *Penstemon heterodoxus* var. *shastensis* and *Stellaria obtusa* are stable within the project area and the loss of a few plants during project implementation would not affect the viability of these species even when added cumulatively to past, ongoing or future impacts within the project area.

Alternative 2 - No Action

Direct Effects to Special Interest Plants

There would be no direct effects to *Betula pumila* var. *glandulifera*, *Botrychium simplex*, *Claytonia palustris*, *Drosera anglica*, *Penstemon heterodoxus* var. *shastensis* or *Stellaria obtusa* from the No Action alternative other than those associated with ongoing management activities.

Indirect Effects to Special Interest Plants

Indirect effects of no action would be those associated with continued habitat succession, ongoing activities, the current and future threat of noxious weed invasion or risk of wildfire. There would be no indirect effects to *Betula pumila* var. *glandulifera* or *Drosera anglica*, since these species are found in relatively stable habitats such as fens and open meadows. Habitat succession in the project area would cause increased forest canopy cover and shading, and a reduction in forest openings. Since *Claytonia palustris*, *Penstemon heterodoxus* var.

shastensis and *Stellaria obtusa* are often associated with forest openings, habitat succession could decrease the vigor of some occurrences of these species in the project area as small openings become vegetated over time with shade tolerant species. The effects to *Botrychium simplex* from continued habitat succession would be similar to those indirect effects described for Sensitive *Botrychium* spp. within No Action Alternative for Sensitive plants. The future threat from noxious weed invasion within the project area should be minimal, since the Noxious Weed Risk Assessment for the Creeks Forest Health Recovery Project (Appendix B) determined that there was a low habitat vulnerability and low to moderate non-project dependant vectors within the project area, in the absence of the proposed action. In addition, since all treatable noxious weed occurrences within the project area will be treated regardless of the Alternative chosen, increased threat from noxious weeds with the implementation of the No Action Alternative is not an issue

Finally, it is impossible to determine where, when and how a wildfire may enter an area, thus predicting the effects of wildfire on Special Interest plant populations is unpredictable. Many times the effects of fire suppression can have larger effects on plants and their habitat than the wildfire itself, but actual effects to Special Interest plant species depends on fire timing and intensity. Under the No Action alternative, proposed thinning and broadcast burning would not occur. This may increase the severity of a high intensity fire in the project area as tree density continues to increase and woody fuels accumulate. A high intensity wildfire could kill individuals of *Claytonia palustris*, *Penstemon heterodoxus* var. *shastensis* and *Stellaria obtusa* or considerably alter their habitat. Effects to *Botrychium simplex* from an intense wildfire would be similar to those indirect effects discussed within the No Action Alternative for Sensitive plants.

Cumulative Effects to Special Interest Plants

With implementation of the No Action Alternative there will be no direct or indirect effects to *Betula pumila* var. *glandulifera* or *Drosera anglica*. Therefore, cumulative effects are not a concern for these species from the Creeks Forest Health Recovery project. As with Alternative 1, the project boundary was chosen as the cumulative effects analysis area for the remaining Special Interest plant species for the No Action Alternative. Cumulative effects for past, ongoing and foreseeable future actions for No Action will be identical to those previously discussed for Special Interest plant species for Alternative 1. Unlike Alternative 1 though, there will be also be no direct effects to *Botrychium simplex, Claytonia palustris*, *Penstemon heterodoxus* var. *shastensis* or *Stellaria obtusa,* and only a few indirect effects from habitat succession and the continued risk of wildfire by the implementation of the No Action Alternative. As a result, there will be no new impacts to these species when added cumulatively to past, ongoing, and future actions by the selection of the No Action Alternative.

Alternative 14

Direct Effects to Special Interest Plants

With the implementation of the Integrated Design Features in the Proposed Action, no direct effects to *Betula pumila* var. *glandulifera*, *Botrychium simplex* or *Drosera anglica* are expected with the implementation of Alternative 14. All known occurrences of *Botrychium simplex* and *Drosera anglica* would be flagged and avoided and the fens where *Drosera anglica* and *Betula pumila* var. *glandulifera* occur would receive a 150 ft buffer as part of the Integrated Design Features for wet meadows (fens), so effects to associated fen habitats are not expected. In addition, all occurrences of *Botrychium simplex* and *Betula pumila* var. *glandulifera* are

found either within riparian areas, which would be protected by RHCA buffer zones, or are located outside of proposed treatment units. Direct effects from Alternative 14 to *Claytonia palustris*, *Penstemon heterodoxus* var. *shastensis* and *Stellaria obtusa* will be similar to those described in Alternative 1, except there will be fewer impacts due to the reduction on the number of group selection treatment units for this Alternative.

Indirect Effects to Special Interest Plants

Indirect effects by the implementation of Alternative 14 will be similar to the effects discussion for Alternative 1 for all Special Interest plant species. As in Alternative 1, there will be no indirect effects to *Betula pumila* var. *glandulifera*, *Botrychium simplex* or *Drosera anglica.* In addition, there will be fewer impacts to potential habitat for *Claytonia palustris*, *Penstemon heterodoxus* var. *shastensis* and *Stellaria obtusa* from the selection of Alternative 14 than those described in Alternative 1, due to the decrease in group selection treatment units. There may also be slightly less risk of spreading noxious weeds within the implementation of Alternative 14 as compared to Alternative 1, due to the decrease in group selection treatment units within the project area.

Cumulative Effects to Special Interest Plants

With the implementation of the Integrated Design Features, no direct or indirect effects to *Betula pumila* var. *glandulifera*, *Botrychium simplex* or *Drosera anglica* are expected. Therefore, cumulative effects are not a concern for these species from the Implementation of Alternative 14. Once again the project boundary was chosen as the cumulative effects analysis area for the remaining Special Interest plant species for Alternative 14, due to the lack of knowledge of specific habitat requirements for these species and their historical range within the project area. Cumulative effects for past, ongoing and foreseeable future actions for Alternative 14 will be identical to those previously discussed within Alternative 1. As with Alternative 1, there may be some impacts to *Claytonia palustris*, *Penstemon heterodoxus* var. *shastensis* and *Stellaria obtusa* from the implementation of Alternative 14 and these impacts and may add cumulatively to past, ongoing and future actions discussed within the project area. Theses impacts from the implementation of Alternative 14 though should be smaller than those described within Alternative 1, due to the decrease in group selection units, but any impacts should not be detrimental to the viability of these species within the project area.

Management Indicator Species - Botany

Affected Environment

The 1993 LNF LRMP lists bitterbrush (*Purshia tridentata*) as a Management Indicator Species (MIS) for eastside pine habitats, and willow (*Salix* sp.), alder (*Alnus incana*), cottonwood (*Populus balsamifera* var. *trichocarpa*), and aspen (*Populus tremuloides*) as MIS for riparian areas on the forest.

Existing Conditions

Eastside pine forest does not occur in the project area; therefore, project effects on bitterbrush are not analyzed. Willow, cottonwood, alder, and aspen are widespread in project riparian areas, especially around wet meadows and along larger streams such as Butt and Yellow Creeks. Smaller stands of riparian hardwoods are scattered throughout the project area in wet forest openings, including seeps, springs, meadows, fens, and streams. Isolated aspen stands sometimes occur in openings on drier upland sites. Most sites for these species

are within RHCAs. Riparian hardwoods are important for stream shade and bank stability, litter input for nutrient cycling, vegetative diversity, wildlife habitat, and aesthetics.

Environmental Consequences

Alternative 1 - Proposed Action

Direct Effects to Botany Management Indicator Species

Willows, cottonwoods, alders, and aspens in the project area occur primarily within RHCAs. Project Integrated Design Features for riparian areas include a buffer, consisting of inner and outer zones, and the protection of riparian species from treatment. Selective thinning and removal of fuels would be allowed in both zones; however, no machinery would be allowed to enter the inner zone and no riparian hardwoods would be cut in either zone. Fuels in the inner zone would be removed by hand, or using grapples or cables to minimize disturbance. Riparian hardwoods, including willows, cottonwoods, alders and aspens are usually concentrated within the RHCA inner zone and would be minimally impacted by proposed thinning activities. Many riparian hardwoods in the project area are also protected with 150-foot buffers around wetlands (fens), where no activities would occur.

Underburning is allowed in RHCAs. No ignitions would occur in the inner zone, but broadcast burns would be allowed to creep into this zone. If riparian zones burn at all, the fire is likely to be patchy and low intensity due to the wetness of these habitats, though scattered individual cottonwood, willow, alder, or aspen may be killed by the proposed burning operations. These species are adapted to periodic fire and would resprout from root crowns and boles (Kovalchik, 1987; Steinberg, 2001; Anderson, 2001; Fraser et al., 2004). Patchy burning of cottonwood, willow, or aspen may help maintain a mix of age classes for these species in the project area. Alders can be directly killed by fire, but since fire is likely to be low intensity within RHCAs, and since alders are restricted to saturated habitats (Kovalchik, 1987), they are unlikely to be affected by the proposed burning. Where fuels exceed five tons per acre following treatment, slash would be hand piled. Slash piles would be located at least 50 feet from stream channels, avoiding impacts to most riparian hardwoods.

Aspen stands in the project area occasionally occur outside of RHCAs, within upland coniferous forests with a shallow water table and in rocky habitats. Where aspen stands occur in proposed DFPZs and area thinning units, ladder and canopy fuels may be removed from among the aspens, but no aspens would be cut. Broadcast or pile burning would not occur within aspen clones. Group selection units would be placed to avoid aspen stands.

Therefore, there would be few if any direct effects expected to riparian hardwoods, including willow, cottonwood, alder, and aspen, from the implementation of the Creeks Project, because these species are not targeted for cutting, and because underburns within RHCAs should be patchy and low intensity.

Indirect Effects to Botany Management Indicator Species

Indirect effects (either positive or negative) may directly impact species by changing local hydrologic patterns in riparian areas, or by changing the fire regime or vegetation structure of these areas. As stated above, these species are predominately restricted to the inner zone in designated RHCA areas. As a result, there should be minimal impacts to the hydrology of riparian areas within the project boundary, except in the few areas where channel crossings are removed during road decommissioning operations. There may be beneficial indirect effects from the implementation of Alternative 1, since thinning treatments in surrounding overstocked stands

would help to reduce the severity of a catastrophic wildfire. While many riparian habitats, wet meadows and fens where these species are found are potentially protected from wildfire by the wet habitat they exist in, narrow riparian corridors can be susceptible, and while most riparian hardwoods would resprout after a fire, an intense hot fire can kill these species particularly alders (Steinberg, 2001; Uchytil 1991; Fraser et al., 2004; Uchytil, 1989). Thinning stands that surround aspen clones would provide an additional indirect benefit to this species, which is declining in the west, due to the lack of natural disturbance that is leading to the dominance of many aspen stands by conifers (Hinds, 1985; Mueggler 1985). Dense stands of conifers prevent shade-intolerant aspen suckers from establishing, and can cause the gradual decline of the aspen clones in many areas (Jones et al., 1985).

Cumulative Effects to Botany Management Indicator Species

The project boundary was chosen as the cumulative effects analysis area for riparian hardwoods, since these species are not targeted for removal and Integrated Design Features and RHCA buffers for the Creeks Project were design to ensure that riparian habitat within the project area is minimally impacted from project related activities.

Past Vegetation Management Actions

Past vegetation management actions (Appendix A) within the Creeks Project area have resulted in a variety of disturbances across the landscape. In California, aspen communities are being steadily replaced by conifers due to changes in historic fire regimes and grazing pressure (Mueggler, 1985). For other species such as cottonwoods, willows and alder, it is not known if there has been a long-term decline within the project area, due to the lack of historic range maps for these species. It can be assumed that since past Forest Service projects have required some sort of riparian protections that impacts to these species have been minimal, and have occurred primarily in small isolated locations such as road crossings. Past vegetation treatments on private lands many also have had cumulative impacts to riparian hardwoods, but since survey requirements and mitigations for riparian areas are not known, the type and extent of the impact to these species or their habitat cannot be quantified. Overall, there is no way to determine what impact past activities have or have not had on each species or their riparian habitats, due to a lack of historic knowledge about these species within the project area.

Ongoing Actions

Ongoing vegetation management actions, special uses and recreation projects within the project area (Appendix A) were surveyed to similar standards as the Creeks Project. As with the Creeks Project, similar Integrated Design Features and RHCA buffers were created for these ongoing projects so that there would be minimal impacts to riparian hardwoods and their habitat. Ongoing private actions, as with past treatments, may also have had cumulative impacts to riparian hardwoods or their habitat, but since riparian mitigations are not known, the type and extent of the impact to these species or their habitat cannot be quantified.

Ongoing range management activities could also have impacts to riparian hardwoods and their habitat. All riparian hardwood species are palatable to livestock (Uchytil, 1989; Steinberg, 2001; Uchytil, 1991; Howard, 1996), though some are more preferred than others, and with aspen in particular, livestock overgrazing has been linked to the decline of aspen stands in California (Mueggler, 1985). Trampling by livestock has also impacted some riparian habitats, particularly fens, within the project area. Fen habitats can be significantly

impacted by moderate to heavy use and trampling by cattle, and will begin to lose carbon, due to decreased plant production and increased rates of respiration (Cooper et al., 2004). Fens with a negative carbon balance are in jeopardy of losing their peat body and as a result, the fen ecosystem could be degraded or lost (Cooper et al., 2004). Since there is currently only one active allotment in use within the project area (Appendix A), with a total of 40 head, the impacts to riparian hardwoods is probably minimal within the project area. All of these ongoing impacts though may add cumulatively to those impacts from the implementation of the Proposed Action.

Other ongoing actions within the project area such as ongoing road maintenance, Christmas tree permits, woodcutting, mining operations, and the various recreation activities within the project area may have contributed only incidental effects on these species, if any.

Foreseeable Future Actions

Future actions within the project area (Appendix A), will have similar effects to riparian hardwoods as the Creeks Project since all projects have either been surveyed to similar standards as the Creeks Project or will be prior to project implementation, and Integrated Design Features and RHCA buffers for these projects will be similar.

Alternative 2 - No Action

Direct Effects to Botany Management Indicator Species

There would be no direct effects to riparian hardwoods from this alternative other than those associated with ongoing activities.

Indirect to Botany Management Indicator Species

There may be indirect effects from the risk of a sever wildfire, due in part to increasing stand density and woody fuels in the project area. Though a wildfire would not necessarily be detrimental to riparian hardwoods. Cottonwood, willow, and aspen can all resprout after a wildfire, and often increase in density and vigor after a fire that kills competing conifers (Steinberg, 2001; Uchytil, 1991; Fraser et al., 2004). Alder can also resprout after a low intensity fire, although as fire intensity increases, so does alder mortality (Uchytil, 1989). In the absence of a wildfire, conifer density in the project area would continue to increase under the No Action Alternative. As conifer density increases, riparian hardwoods often decline as they are overtopped and shaded out by the conifer canopy. Aspen is shade-intolerant and clones are particularly impacted by confer encroachment and shading and many times will not regenerate by suckering in these situations (Jones et al., 1985; Mueggler, 1985). As a result, aspen clones will gradually decline and die without suckering in dense confer stands (Jones et al., 1985; Mueggler, 1985).

Cumulative Effects to Botany Management Indicator Species

As with Alternative 1, the project boundary was chosen as the cumulative effects analysis area for riparian hardwoods for the No Action Alternative. Cumulative effects for past, ongoing and foreseeable future actions for the No Action Alternative will be identical to those previously discussed within Alternative 1. Unlike Alternative 1 though, there will be no direct effects and only few indirect effects from the increased threat to wildfire, due to the continued build-up of fuels in the project area. As a result, there will be few if any

additional impacts to riparian hardwoods, due to the selection of the No Action Alternative when added cumulatively to past, ongoing and future actions in the project area.

Alternative 14

Direct Effects to Botany Management Indicator Species

Direct effects from Alternative 14 to riparian hardwoods and their habitat will be similar to those described in for Alternative 1, since Integrated Design Features and RHCA buffers are the same regardless of which action Alternative is chosen.

Indirect Effects to Botany Management Indicator Species

Indirect effects by the implementation of Alternative 14 will be similar to the effects discussion for Alternative 1 for all riparian hardwood species and their habitat, since Integrated Design Features and RHCA buffers are the same regardless of which action Alternative is chosen.

Cumulative Effects to Botany Management Indicator Species

Once again the project boundary was chosen as the cumulative effects analysis area for riparian hardwood species for Alternative 14. Since the direct and indirect effects for these species are identical for riparian hardwoods from both action Alternatives, then the cumulative effects for past, ongoing and foreseeable future actions for Alternative 14 will be identical to those previously discussed within Alternative 1

Economics

This section provides the methodology and analytical basis for the economic comparison of alternatives. The values used in the analysis are approximate and discounted to 2005 dollars. When applied consistently throughout the analysis, they give a relative value to compare the alternatives. These values are not intended to be a precise measure of an alternative's economic effect.

Affected Environment

Analysis Methods

The economic efficiency of the alternatives was analyzed using the present net value (PNV) of revenues and costs anticipated during the life of the project using Quick-Silver software (Vasievich et al., 2002). Present net value can be viewed as the lump sum of money the decision maker would have in hand as a result of committing forest resources to a particular alternative.

Present net value is used as an indicator of economic efficiency and is used in conjunction with other factors in the decision-making process. Present net value combines benefits and costs that occur at different times and discounts them into an amount that is equivalent to all economic activity occurring in a single year. Economic impacts are displayed as cost and revenue estimated to result from implementation of each alternative.

Environmental Effects

Alternative 1 - Proposed Action

Direct Effects to Economics

Costs and Revenues associated with all Alternatives are displayed in Table 3-74. Values in Table 3-74 are expressed in current day dollars. Present net values are discussed below and are summarized in Table 3-75. Activity Revenues are the estimated value of wood fiber that would be removed from the project as a result of implementing DFPZ treatments, area thinning treatments, and the Group Selections. Revenues would be collected in the form of stumpage paid by contractors for both sawtimber size material (generally trees larger than 10 inches dbh), and biomass material (generally trees between 3 and 10 inches dbh). Alternative 1 would generate an estimated $10,504,537 in revenues. Costs for each alternative outlined below include all dollars that would be expended to plan and implement the alternatives. Total cost for Alternative 1 is estimated at $8,322,652.

Table 3-76 shows the total present value costs for each Alternative. Present Value costs for Alternative 1 is estimated to be $7,940,143. Revenue generated from the sale of commercial timber is a direct benefit. Alternative 1 would remove an estimated 273,650 CCF of wood fiber in the form of both sawlogs and biomass. Present value revenue was estimated to be $9,165,953. The present net value for Alternative 1 was estimated at $1,225,810 and a benefit-cost ratio of 1.15, which indicates that the timber sale value would exceed the cost of the non-timber sale related activities.

Table 3-74. Costs and revenues for the Creeks Project by alternative.

Costs / Revenues 2004	Alternative 1 - Proposed Action	Alternative 2 - No Action	Alternative 14
Activity Revenues			
Value of wood fiber included in contracts	$10,504,537	$0	$10,201,809
Activity Revenues Subtotal	$10,504,537	$0	$10,201,809
Administrative Costs			
Planning, NEPA Document Preparation	$678,275	$678,275	$678,275
Project Preparation and Contract Administration (Timber Sales)	$1,565,250	$0	$1,556,400
Prep & Administration DFPZ &Area Thins (Service Contracts)	$249,375	$0	$241,875
Administrative Costs Subtotal	$2,492,900	$678,275	$2,476,550
Activity Costs			
Vegetation Treatments			
DFPZ surface and ladder fuels	$1,347,330	$0	$1,291,770
Area Thin Surface and Ladder Fuels	$500,040	$0	$500,040
Group Selection	$2,023,125	$0	$1,927,250
Vegetation Treatments Costs Subtotal	$3,870,495	$0	$3,719,060
Roads			
New Construction (Unclassified Road)	$4,370	$0	$4,370
Construct Temporary Road (New)	$74,000	$0	$74,000
Decommissing Temporary Road (New)	$45,325	$0	$45,325
Construct Temporary Road (Unclassified)	$25,000	$0	$25,000
Decommission Other Road System	$14,640	$0	$14,640
Road surfacing cost for all priority roads	$1,434,222	$0	$1,434,222
Road surfacing cost for stream crossings	$325,200	$0	$325,200
Roads Costs Subtotal	$1,959,257	$0	$1,959,257
Activity Costs Total	$8,322,652	$0	$8,154,867

Source: Creeks Forest Health Recovery Project Economic Spreadsheet

Table 3-75. Present Value Costs, Present Value Revenue, Present Net Value and Benefit-Cost Ratio by alternative

Alternative	Present Value Costs	Present Value Revenue	Present Net Value	Benefit-Cost Ratio
Alternative 1 - Proposed Action	$7,940,143	$9,165,953	$1,225,810	1.15
Alternative 2 - No Action	$678,275	$0	-$678,275	0.00
Alternative 14	$7,858,281	$8,901,801	$1,043,520	1.13

Source: Creeks Forest Health Recovery Project Economic Spreadsheet

Indirect Effects Foreseeable Future Actions

Foreseeable Future Actions

Indirect effects of Alternative 1 are additional public benefits such as local employment, income generated from the forest products industry, and energy from local cogeneration plants. Based on historical relationships

between employment and harvest in California during the 1980's each million board feet harvested supports 6.5 year round jobs, 1 in logging, 4 in sawmill, and 1.5 in Forest Service Employment. In regional economic models of employment for California and the Pacific Northwest, an estimate of one indirect or induced job for every direct timber job is added. (Empire FEIS, 2005) Induced jobs result from employment created by the local purchase of materials for the sawmill, local expenditures by workers and the demand for local government employees. The restoration and fuel work would support additional direct and induced employment. All jobs are equivalent to year round employment. Based on these assumptions, Table 3-76 displays the predicted total full time jobs and associated employee-related income resulting for each alternative. Alternative 1 would create an estimated 991 full time jobs for direct and induced employment. Based on a medium income of $35,863 for Plumas County residents (US Census 2000, adjusted to 2005), the total employee related income for Alternative 1 would be $35,540,223.

Table 3-76. Comparison of Employment Related Effects

Alternative	Total Full-time Jobs	Total Employee Related Income
Alternative 1 - Proposed Action	991	$35,540,223
Alternative 2 - No Action	0	$0
Alternative 14	965	$34,607,795

Cumulative Effects to Economics

Foreseeable Future Actions

The cumulative effects of this project would include the maintenance costs associated with the various treatments. Maintenance of the DFPZ is estimated to cost $1,569,710. The projected cumulative impacts of this project when combined with other projects would be to further increase employment and contracts to accomplish such work. This alternative would add value to the pilot project when considered as a whole. The cumulative economic benefits, revenues and expenditures for the Herger-Feinstein Quincy Library Group Forest Recovery Act pilot project are documented annually in a Status Report to Congress (USDA, Forest Service, 2000-2005)

Alternative 2 – No Action

Direct and Indirect Effects

Foreseeable Future Actions

Project planning costs are sunk costs incurred initially because they are incurred regardless of the alternative selected. Planning costs for the project is estimated at $678,275 for the No Action Alternative. This alternative proposes no action and produces no economic outputs. No DFPZ, area thinning, group selection, road management, or monitoring activities would occur. No market benefits, (direct, indirect or non-quantifiable) can be attributed to this alternative. Implementation of the No Action alternative will not provide additional public benefits to local jobs or income generated from the forest products industry.

Cumulative Effects to Economics

Foreseeable Future Actions

Implementation of the No Action Alternative would produce no employment and no service contracts (USDA FS, 1999a).

Alternative 14

Direct Effects to Economics

Costs and Revenues associated with Alternative 14 are displayed in Table 3-76. Values in Table 3-76. Present net values are summarized in Table x-xx. Alternative 14 would generate an estimated $10,201,809 in revenues. Total cost for Alternative 14 is estimated at $8,154,867.

Table 3-76 shows the total present value costs. Present Value costs for Alternative 14 is estimated to be $7,858,281. Revenue generated from the sale of commercial timber is a direct benefit. Alternative 14 would remove an estimated 268,535 CCF of wood fiber in the form of both sawlogs and biomass. Present value revenue was estimated to be $8,901,801. The present net value for Alternative 14 was estimated at $1,043,520 and a benefit-cost ratio of 1.13, which indicates that the timber sale value would exceed the cost of the non-timber sale related activities.

Indirect Effects to Economics

Indirect effects of Alternative 14 are similar to those discussed for Alternative 1. Table 3-76 displays the predicted total full time jobs and associated employee-related income resulting for Alternative 14. Alternative 14 would create an estimated 965 full time jobs for direct and induced employment. The total employee related income for Alternative 14 would be $34,607,795.

Cumulative Effects to Economics

The cumulative effects of Alternative 14 would be the same as those described for Alternative 1.

Range

Affected Environment

The Creeks Project area overlaps portions of four livestock grazing allotments on the Almanor Ranger District, including the Butt Creek, Soldier Meadows, Soda Creek/North Butte, and West Humbug Allotments. The current status of these allotment permits is listed in Table 3-77. Figure 3-24 displays the four livestock grazing allotments on the Almanor Ranger District.

Butt Creek Allotment: Approximately twenty-five percent of the acres of Creeks Project area lie within the Butt Creek Allotment, which is currently vacant. The previous permit for the allotment was for 70 cow calf pairs from 6/1 to 9/30. The grazing authorization was cancelled in 1999 due to permit noncompliance. The previous permittee had their ranch headquarters on the private land in holdings referred to as Ruffa Ranch.

Table 3-77. Permitted livestock numbers and seasons

Allotment Name	Livestock Class	Livestock Kind	Livestock Numbers	Season of Use	Status
Butt Creek	Cattle	Cow/Calf	70 on	06/01-09/30	Vacant
Soldier Meadows	Cattle	Cow/Calf	20 on / 200 off, 220 total	06/01-09/30	Vacant
Soda Creek/North Butte	Cattle	Cow/Calf	20 on / 20 off, 40 total	06/16-09/15	Active
West Humbug	Cattle	Cow/Calf	30 on / 670 off, 700 total	06/01-09/30	Nonuse

Source: Almanor Ranger District 2230 Permit Files

Soldier Meadows Allotment: Approximately ten percent of the acres of Creeks Project area lie within the vacant Soldier Meadows Allotment. The permit was cancelled in 2004 for exceeding permittee convenience non-use (over three years of non-use was taken). The previous grazing authorization was for 220 cow-calf pairs during the season of June 1 through September 30 on the allotment through on/off provisions (20 on/200 off).

Soda Creek North/Butte Allotment: Approximately forty-one percent of the acres of Creeks Project area lie within the Soda Creek/North Butte Allotment, mainly within the east portion or Soda Creek Unit. Under the current term permit, the permittee is authorized to place approximately 40 cow/calf pairs on the allotment under the provisions of an on/off permit from 6/16 to 9/15. Authorized use may occur from June 1st and September 30th depending on forage conditions. Cattle are generally placed first in the lower country and on private lands, and then they are moved up into the higher country. Due to a concern over toxic effects to cattle (calves) from eating poisonous lupine (Lupinus spp.), the use of some areas is limited. The permittee has an allotment headquarters on private land at Little Grizzly Valley.

West Humbug Allotment: Approximately twenty-four percent of the acres of Creeks Project area lie within the West Humbug Allotment. The allotment has been in non-use status since 2000. At that time there was nonuse for resource protection on areas burned in the Storrie Fire. In addition Pacific Gas & Electric Company (PG&E) discontinued grazing on the private lands within the allotment. This exclusion of grazing from the Storrie fire burn area and private lands has forestalled grazing operations on the allotment to present time. When in activation, the permit for West Humbug Allotment authorized grazing of 700 cow/calf pairs from June 1 to September 30 through on/off provisions (30 on/670 off).

Range Social and Economic Values

The four allotments affected by the Proposed Action are located in rural Plumas and Butte Counties. The active allotments are primarily operated by permittees and their families. These operations are generally small and their affect on the general economy is minor. A limited number of permittees may offer work to employees on a full-time basis, and some may pay temporaries for help in times of need. Annual permittee costs and revenues generally include expenditures for grazing fees, labor, travel, equipment, and supplies for handling and distribution of animals, salt placement, maintenance of fence structures, monitoring, and adjustments due to climatic fluctuations. Operational costs of the livestock operation would include grazing fees at $1.79 per head month in 2005.

On the active Soda Creek/North Butte Allotment, the permittees who currently own and graze cattle in this area derive their primary income from their livestock operations and other agricultural related activities. Benefits would include sustaining the production of 462 permitted animal month units (AUMs) per year on both the private and forest service administrated lands within this allotment. Costs would include grazing fees for 20 head of cattle on Forest Service administrated lands, maintenance of five range improvement structures, and expenditures for the above mention items.

Social, cultural, and aesthetic values, including family traditions, ranching community interest and involvement, conservation and environmental preservation values are also associated with these allotments and the permittees that manage cattle use.

Capable Range

Livestock grazing mainly occurs on areas that have been determined to be capable for livestock grazing, which mainly consists of riparian vegetation on these allotments. Large portions of the allotments are non-capable for grazing because of steep topography, dense timber stands, or distance from water. Table 3-78 displays acres by allotment and capable range acres. Rangeland suitability will be determined under a separate environmental analysis, as described under the Present Condition Section.

Table 3-57. Rangeland capability by allotments

Allotment Name	Creeks Project Area Acres	Allotment Acres			Capable Acres		
		Total	NFS	Other	Total	NFS	Other
Butt Creek	8,321	11,563	11,281	282	1,388	1,354	34
Soda Cr/ No. Butte	13,252	28,837	27,267	1,570	2,621	2,500	121
Soldier Meadows	3,125	55,298	17,330	37,968	830	260	570
West Humbug	7,873	24,389	11,378	13,011	3,048	1,422	1,626

Source: Lassen NF Range Infra Database

Vegetation Monitoring and Use

Available forage species for cattle on the allotments includes herbaceous riparian vegetation in meadow and occasionally near streams and wetlands, and may also occur in the understory of willow, alder, cottonwood and aspen. Herbaceous vegetation typically associated with riparian areas on these allotments includes Nebraska sedge (*Carex nebrascensis*), Kentucky bluegrass (*Poa pratensis*), oatgrass (*Danthonia unispicata*), pullup muhly (*Muhlenbergia filiformis*), creeping bentgrass (*Agrostis stolonifera*), spikerush (*Eleocharis ascicularis*), Baltic rush (*Juncus balticus*) and other rushes (*Juncus orthophyllus*), and mountain clover (*Trifolium wormskioldii*). Forbs such as primrose monkeyflower (*Mimulus primuloides*), alpine aster (*Aster alpigenus*), and American bistort (*Polygonum bistordiodes*) are also found in most meadows as well as other grasses, sedges, forbs and shrubs. Most of the riparian areas are surrounded by conifer forest including lodgepole pine, which are in various stages of encroachment.

Key Areas

Key areas are established in several locations on all the allotments. The key areas on active allotments are monitored to ensure standards and guidelines are being met and to provide a basis for any adjustments that were necessary. The main key areas established on the allotments are listed in Table 3-79. Figure 3-24 displays the key areas within the livestock grazing allotments.

Table 3-79. Key Areas for monitoring range use

Allotment	Benchmark No.	Benchmark Name	Subwatershed Name
Soda Creek/ North Butte	KA47A	Little Grizzly (upper, mid, lower)	Grizzly Creek
	KA47B	Milkhouse Flat	Soda Creek
	KA47C	Ben John	Grizzly Creek
	KA47D	Yellow Creek	Upper Yellow Creek
	KA47E	LT Creek (1 & 2)	Soda Creek
Butt Creek	CT12A	Upper Ruffa	Ruffa
	CT24	Ruffa Ranch	Ruffa
	CT25	Butt Creek	Ruffa
Soldier Meadows	CT36, 36A	Soldier Creek	Soldier Creek
	CT35*	Stover Mountain*	Soldier Creek
West Humbug	CT38	Yellow Creek Meadow	Upper Yellow Creek
	CT11A	Yellow Creek Crossing	Upper Yellow Creek
	KA53A*	Yellow Creek	Upper Yellow Creek

Source: Almanor Ranger District 2210 Allotment Files
*Note: These Key areas are outside of the Creeks Project area, but within the Allotments.

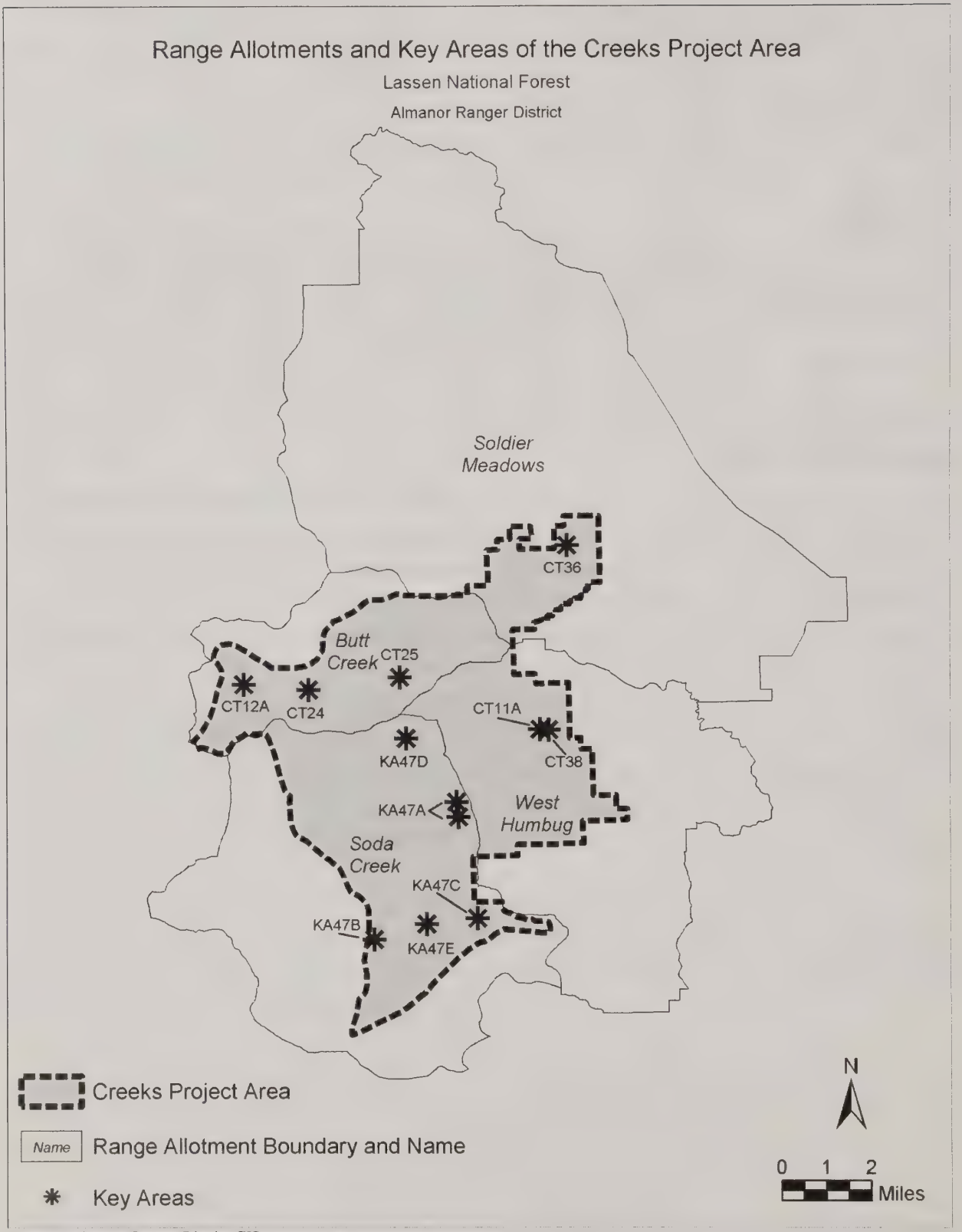
Annual Monitoring

Generally, annual use data is taken in key areas three times a year. Prior to a permittee bringing livestock onto the allotment, key areas are assessed for range readiness. During the grazing season, key areas are evaluated to determine the level of mid-season use. At the end of the grazing season, key areas are measured for final utilization. If allowable use standards are reached or exceeded on key areas prior to the end of the permitted grazing season, livestock are moved to other areas that are within standards or removed from the allotments.

Long Term Trend Monitoring

At some of the key areas, additional information is gathered on condition and trend. Monitoring studies to determine long term trend have been established at various locations within the allotments over the past 30 years. The monitoring data collected is used to determine if rangeland conditions are static, or moving in an upward or downward trend and may be used to make any needed adjustment in requirements of the Allotment Management Plans. Data from sampled areas is filed at the Almanor District Office.

Figure 3-24. Range Allotments and Key Areas of the Creeks Project Area



Source: Almanor Ranger District GIS
Range Improvements

Range improvements within the allotments are indicated in Table 3-80.

Table 3-80. Existing range improvements

Allotment	Name	Type	Year Const.	Condition	Within Treatment Areas Yes/no
Soda Creek North Butte	Ben Jon Swamp Fence (near Peacock Point)	Wire electric fence	1995	Satisfactory	Within DFPZ zone, adjacent to treatment areas
	LT Creek Fence	Wire electric fence	1997	Satisfactory	No
	Cold Springs Fence	Wood rail fence	1985	Satisfactory	No
	Cold Springs Water Development	Metal water trough	1985	Satisfactory	No
	Little Grizzly Fence	Wire electric fence	(privately owned)	(privately owned)	Adjacent to treatment areas
Butt Creek	Fees Place Corrals	Barbed wire, fence, wood corral, chute	1942	Satisfactory	No
	Cattleguard	Metal cattleguard	1984	Unsatisfactory	No
	Ruffa Ranch Fences	Barbed wire, wood	(privately owned)	(privately owned)	Adjacent to treatment areas
West Humbug	Yellow Creek Exclosure	Smooth wire fence	1988	Satisfactory	No
	Big Creek Exclosure	Split rail & barbed wire fence	1994	Satisfactory	No
	Middle Hollow Drift Fence	Barbed wire fence	1965	Satisfactory	No
	Yellow Cr. Lower Boundary Fence	Smooth wire fence	1983	Satisfactory	No
	Cattleguard	Metal cattleguard	1965	Satisfactory	No
	Cattleguard	Metal cattleguard	1965	Satisfactory	No
	Cattleguard	Metal cattleguard	1983	Satisfactory	No
	Cattleguard	Metal cattleguard	1988	Satisfactory	No
Soldier Meadows	Soldier Creek Exclosure	Smooth wire fence	1988	Satisfactory	No

Source: Almanor Ranger District Infra Database, 2240 Range Improvement Files

Desired Condition

Desired condition for the range within the allotments is tiered to the 1993 LNF LRMP as amended, Rescission Act of 1995 Allotment Schedules (1996), 1999 HFQLG ROD, and 2004 SNFPA ROD.

The desired condition for the range resource is to ensure that rangelands are productive in terms of livestock forage, wildlife and fisheries habitat, and water quality. Also, the desired condition is for range productivity to be in a satisfactory or better condition with a stable or improving trend, and riparian areas reach natural or achievable site potential and desired ecological conditions. Desired conditions for riparian areas, where site potential exists, are late seral communities in good or better condition.

Current Condition

The present condition of each allotment is discussed below. The existing fuels condition is discussed in the Purpose and Need section. In most cases grazing areas occur outside of forested areas, but canopy closure may have decreased the amount of available forage on the allotments.

Allotment Management Plans (AMPs) for the allotments are in need of revision, and a project-level analysis evaluating the site-specific impacts of grazing activity, in conformance with the National Environmental Policy Act needs to be completed. The Lassen National Forest has scheduled this work according to Public Law 104. The Soda Creek/North Butte Allotment has been scheduled for an evaluation and a decision is expected to be completed by 2006. The vacant/inactive allotments within the Creeks Project area have also been scheduled for review in 2005 and 2006. Upon completion of the scheduled NEPA analysis and decisions, the terms and conditions of existing grazing permits may be modified or re-issued, if necessary to conform to such NEPA analysis. The vacant allotments are also expected to be re-evaluated for permanent closure during Forest Plan revision, which is scheduled for completion by the year 2008. A suitability study would be conducted at that time, and a determination made whether the allotments should be kept in active status or closed.

Butt Creek Allotment: On the vacant Butt Creek Allotment, past heavy grazing especially near the private lands was known to occur, and the present condition of riparian areas within the allotment are still moving towards meeting desired conditions. Most of these areas are in an improving trend, but improvement has been slow especially in riparian areas along Butt and Shanghai Creeks. Additional rest from livestock grazing may move the allotment toward achieving desired conditions, which include an increase in perennial rhizomatous graminoid species such as Carex species near Condition and Trend (CT) Study Site 12A (Upper Ruffa), and for aspen regeneration to rise above the browse zone (approximately 4.5 feet). In the area around CT24 (Ruffa Ranch), additional rest from livestock grazing may enhance willow expansion and stabilization from past downcutting and flooding.

Soda Creek/North Butte Allotment: During the last several years, the Soda Creek/North Butte Allotment has remained in compliance with permit terms and conditions and Forest Plan standards and guidelines. Management of the allotment has been adapted to address riparian concerns by applying a grazing system keyed to moving livestock, with the use of fenced pastures, and a reduced stocking rate. The grazing permittee spends a substantial amount of time on the allotment to move livestock out of riparian areas, and the key areas have generally had acceptable levels of forage utilization.

Soldier Meadows Allotment: On this vacant allotment, the majority of the forage was located on privately owned lands within Fanani Meadows and along Soldier Creek. The main portion of the allotment within the national forest boundary included small stringer meadows along Soldier Creek between Soldier and Fanani Meadows. The allotment was most recently used for trailing, and some use also occurred near Willow Creek. Stream protection projects and rest from grazing may have allowed allotment conditions to have attained an upward or static trend and the present condition of riparian areas may be moving towards meeting desired conditions.

West Humbug Allotment: This allotment has not been grazed for several years. In 2000, drought, the Storrie Fire, and lack of availability of PG&E private lands for grazing affected grazing operations on the allotment. There were some concerns with past heavy use along Yellow Creek. Since the allotment has been inactive, the trend in vegetation condition, especially surrounding range improvements and areas of past heavy grazing use may have also attained an upward or static trend.

Creeks Project Area: As discussed above, the key areas within the Creeks Project area are generally in satisfactory rangeland condition with the exception of the areas mentioned. Proper Functioning Condition

(PFC) ratings for lentic (meadows) and streams within the allotments were estimated, derived from stream inventory data discussed in the Watershed section of this document and existing allotment information. A summary of conditions is indicated in Table 3-81.

Table 3-81. Present Range Conditions

Bench-mark Name	Sub water-shed Name	PA Threshold of Concern	Meadow Function	Eco-logical Status	Woody Riparian	Stream Stability	Stream Function*	Soil Cover
KA47A Little Grizzly	Grizzly Creek	Within	Properly functioning	Moderate	Meeting Standards	Stable	Properly functioning	Meeting Standards
KA47C Ben John	Grizzly Creek	Within	Properly functioning	Moderate	Meeting Standards	N/A	Properly functioning	Meeting Standards
KA47B Milkhouse Flat	Soda Creek	Within	Properly functioning	Moderate	Meeting Standards	N/A	Properly functioning	Meeting Standards
KA47E LT Creek	Soda Creek	Within	Properly functioning	Moderate	Meeting Standards	Stable	Properly functioning	Meeting Standards
CT12A Upper Ruffa	Ruffa	Within	Properly functioning	Low	Aspen recruitment improving	Restored, Stable	At Risk	Not meeting standards
CT24 Ruffa Ranch	Ruffa	Within	At Risk	Moderate	Willow establishment improving	Active Cutting	At Risk	Meeting Standards
CT25 Butt Creek	Ruffa	Within	At Risk	Low	Willow establishment improving	Active Deposition	At Risk	Not meeting standards
CT36,36A Soldier Creek	Soldier Creek	Within	Properly functioning	Moderate	No Data	Restored, Stable	Properly functioning	Meeting Standards
CT35 Stover Mountain	Soldier Creek	Within	Properly functioning	Moderate	No Data	Stable	Properly functioning	Meeting Standards
CT38 Yellow Cr. Mdw	Upper Yellow Creek	Within	Properly functioning	Moderate	No Data	Stable	Properly functioning	Meeting Standards
CT11A Yellow Creek	Upper Yellow Creek	Within	At Risk	Moderate	No Data	Restored, Stable	Properly functioning	Meeting Standards
KA47D Yellow Creek	Upper Yellow Creek	Within	Properly functioning	Moderate	Meeting Standards	Stable	Properly functioning	Meeting Standards

Source: Stream survey data, Watershed/Fisheries/Soils Section and 2210 Allotment files.

Environmental Effects

Alternative 1 - Proposed Action

Direct Effects to Range

Under the Proposed Action, grazing on the active allotments (Soda Creek/North Butte) is expected to continue at current levels, which is at its lowest point when compared to historic levels. Impacts from this alternative would be minimal to the vacant allotments or to those permittees taking or expecting to take non-use.

As listed in Table 3-80, most fences and range improvements within the allotments are not located within areas proposed for treatment. Range improvements including fences and corrals bordering private lands at Little Grizzly Creek (Soda Creek/North Butte Allotment) and the Ruffa Ranches (Butt Creek Allotment) are located near proposed project activity however, and these improvements would need to be avoided or repaired if damaged during project activities. Roads (some of which contain cattleguards) used for the project would receive maintenance as described in the Proposed Action.

Advance notification of project activities and coordination with the permittees would reduce any unexpected distribution of cattle caused by project noise and activity. As road closures occur, the permittees could adjust travel timing (before or after project work hours), and they may be able to access some areas using trails by all-terrain-vehicle or horseback. If cattle needed to be removed from activity areas, they would be gathered or herded in small groups following roads and trails. It is unknown whether new roads or decommissioning roads would affect the cattle operation. Reductions in grazing use are not anticipated, and costs associated for any additional moving of cattle away or out of the project area are unknown.

There could be a risk of vehicle collisions or other incidents with livestock during project activities. Contract safety specifications would reduce the risk of incidents, and the quality of the roads would also reduce a vehicle's travel speed, thus minimizing the risk of livestock collision. Coordination with the permittee in advance and signing along Forest system roads to alert the public to potential hazards would also help reduce incidents.

Most range study areas and transects occur within riparian areas within the allotments, and would not be affected by slash piling. If project activities did come close to a study area, transects would be marked with items such as T-posts, cages, rebar with yellow caps, painted PVC posts etc., and these areas would be avoided. On the Soda Creek/North Butte Allotment, the closest study site to any proposed treatments is at the key area at Ben Jon Swamp (KA47C). This meadow is fenced and the riparian area would be avoided. There are no proposed treatments close to any other study sites within the allotment, including Little Grizzly (KA47A), Milkhouse Flat (KA47B), Upper Yellow Creek (KA47D), and LT Creek (KA47E). On the West Humbug Allotment, study sites would not be affected since transects at Yellow Creek (CT11A) and Yellow Creek Meadow (CT38) are not located within areas proposed for treatment. Site CT11A may be near the edge of an area thinning zone, however, piling would not take place within any riparian areas. On the Butt Creek Allotment, Upper Ruffa (CT12A), Ruffa Ranch (CT24), and the Butt Creek (CT25) study sites are not located at treatment areas, although thinning is proposed near CT25. On Soldier Meadows, study site CT36 is located near an area proposed for thinning, but not close and the other study areas are located outside of the Creeks project area.

Subsoiled landings and other areas that contain loose soil or mulch could also be accessed and disturbed by cattle. The likelihood of cattle returning or congregating at a particular area is unknown; salt blocks would be placed in agreed locations to reduce the potential of cattle congregating at sites needing protection.

It is not anticipated that prescribed fire would displace livestock grazing activities. Underburn projects would generally occur in non-capable grazing areas with completion after September 15th, the scheduled off date for the active allotment. All prescribed fire implementation would follow specific Burn Plans and permittees could be notified in advance if adjustments to their operations needed to be made. It is unknown whether burned areas would need to be restricted from livestock grazing, since these may not be located near the main livestock use areas.

Indirect Effects to Range

Natural and artificial regeneration efforts within group selection units would be monitored and an assessment of any livestock impacts could be completed. Regeneration efforts within group selection areas could be affected by livestock within active allotments, which at this time includes approximately 41% of the Creeks Project area within the Soda Creek/North Butte Allotment.

If needed, the standard and guideline to defer livestock grazing may be required for two growing seasons after burning to allow desirable plants to establish. Hardship could result to the permittees if they were required to find other areas to graze cattle or reduce numbers during this deferment period, especially given that the permittees of the Soda Creek/North Butte Allotment have already greatly reduced their operation. On this allotment, cattle are frequently moved and distributed throughout riparian areas, and they are also kept within fenced areas during a portion of the season; deferred use is not expected to be necessary. If required, this change could result in an inconvenience or economic loss to the permittees.

Livestock impacts to treated aspen areas are anticipated to be short term in duration, since young aspen should grow above the browse level within 3-5 years. Plantations and young aspen would be monitored and if needed, protective barriers or temporary fence could be installed in active allotments to prevent cattle entry. Any new range fences would be planned separately from this project and exact locations and designs of new improvements would be determined later in a site-specific NEPA document.

Currently, the risk of non-native invasive species spread due to livestock would be within Soda Creek/North Butte Allotment; approximately 41% of the Creeks Project area. Project specifications and post project monitoring, included in the Proposed Action, describe the procedures that would be followed.

The proposed project could have a positive effect on rangeland availability and health by creating additional forage within the treated areas. Forage production and accessibility could be increased on up to approximately 10,600 acres within the allotments, and new areas of transitory range could be created which could improve livestock distribution and use patterns.

On the Soda Creek/North Butte Allotment, transitory range could be created near the key area at Ben Jon Swamp (site KA47C, near Peacock Point) since this area is within a DFPZ zone and treatments are planned near this location. Most other areas of cattle use within the Soda Creek/North Butte Allotment are not located adjacent to any proposed treatments, and it is unknown whether cattle would use more distant areas as transitory range. The key area at Little Grizzly (KA47A) is located within a DFPZ zone, however no treatments are proposed in the area under this project. The key area (KA47B) at Milkhouse Flat is also farther away from proposed treatments, but some groups are planned along road 26N31A, which the permittee and the

livestock use for access. Key area (KA47D) along Upper Yellow Creek is also within a DFPZ zone, but the site is not close to planned treatments. Treatments are planned both up and down the canyon; however, cattle may trail over the ridge from the Scotts John area to access the Yellow Creek area. Study site (KA47E) at LT Creek is also not close to proposed treatments. At this time, it is unknown whether treatments in areas not previously used by cattle would result in additional forage or benefit livestock the operation. Monitoring of grazing standards and guidelines would be implemented in grazing use areas. Additional monitoring may be added if new key use areas become established with the addition of transitory range or improved cattle distribution from thinning activities.

Cumulative Effects to Range

The area considered for cumulative effects is the Butt Creek, Soda Creek/North Butte, Soldier Meadows, and West Humbug Allotments, as shown in Figure A-10 in Appendix A, because these allotments overlap the Creeks Project area. Surrounding allotments, which include the Deer Creek, Chips Creek, Butte Meadows and Coon Hollow Allotments, were not included mainly because they are either vacant, separated from the Creeks Project area by natural barriers, or the portions of these allotments that are adjacent to the Creeks Project boundary are not generally grazed. The Butte Meadows and Chips Creek Allotments are vacant and not included. The Deer Creek Allotment is active, but currently only the northern portion above Highway 36 is grazed so this allotment was not included. The Coon Hollow Allotment is active, but grazing mainly occurs within the Coon Hollow drainage, which is separated from the project area by a ridge as well as a portion of the Soda Creek/North Butte Allotment that is also outside of the Creeks Project area. Some grazing occurs north of the Snag Lake area, but levels are generally low and of short duration therefore the Coon Hollow Allotment was not included in the cumulative effects area. Past actions, present actions and future actions and the effects of livestock grazing when considered in sum are as follows.

The description of the allotment's background discusses past grazing activities in the analysis area. Livestock grazing on the four allotments has occurred in variety of forms since the early 1900's and numerous grazing systems have been implemented along with accompanying range improvements.

Previous vegetation management projects listed in the List of Cumulative Actions (Appendix A) have provided, or are providing, transitory grazing opportunities for livestock, since more open forest habitat would result in additional forage for livestock as more sunlight and moisture reach the forest floor. These particular allotments have not been reliant on transitory rangelands and no major changes in grazing use is known to have occurred on these allotments due to past projects.

Overstory removal would result in a thinner canopy with intermittent openings in areas that may have been previously inaccessible to livestock. The cumulative effect of openings within the allotments is a temporary increase in foraging areas for livestock as well as improved access between grazing use areas. As discussed in the Fire-Fuels section of this document, past openings have not received additional fuels reduction treatments and in some areas surface dead material has accumulated. Livestock management activities would be comparable to current operations.

Intermediate sanitation would result in the removal of all residual debris from logging operations, opening areas previously covered by dense under-story. The cumulative effects to the project area, as a result of past and ongoing (on private lands) intermediate sanitation is expected to be minimal as discussed above.

Clear cutting would create open areas and uniform stands that extend over substantial areas, and some areas would have established with grasses or brush, which may be utilized as transitory range. Some areas of past clearcutting adjacent to areas of grazing use may be utilized. The cumulative effect of past and ongoing (on private lands) clearcutting within the allotments is a temporary increase in foraging areas for livestock. Low and/or discontinued use of the vacant grazing allotments may result in a relatively minor accumulation of fine fuels in the form of cured grasses and forbs in the planning area.

Seed step shelterwood would open some of the overstory. As with overstory removal, the cumulative effect of past project activities would be comparable to current livestock operations.

Prep shelterwood would open some of the overstory. As with overstory removal, the cumulative effect of past project activities would be comparable to current livestock operations

Fire rehab-salvage/planting would open areas previously covered by dense under-story and create uniform stands that extend over substantial areas. Some open areas may support grasses or brush and may be utilized as transitory range. Fire rehab-salvage/planting as part of previous vegetation management projects have resulted in openings within the allotments. Wildfire such as the Storrie Fire occurred in portions of the West Humbug and Soda Creek/North Butte Allotments, and fire suppression activities (controlled burning) extended into the area surrounding the Ben Jon Swamp key area. The cumulative effect of past and ongoing (on private lands) fire rehab-salvage/planting within the allotments is a temporary increase in foraging areas and improved access for livestock. As discussed in the Fire-Fuels section of this document, these openings have not received additional fuels reduction treatments and in some areas surface dead material has accumulated.

Thin from below would blend with the surrounding existing landscape and appear similar to the natural variability encountered on the landscape. Cumulative effects, as a result of past reduction in the tree canopy by thinning from below, may be a temporary increase in foraging areas and improved access for livestock.

Thin from above would also be similar to the natural variability encountered on the landscape, mainly on steeper slopes. Cumulative effects, as a result of past reduction in the tree canopy by thinning from above may be a temporary increase in foraging areas and improved access for livestock although the openings would likely be isolated in areas of non-capable range.

Windthrow salvage would open areas where access would have been blocked. Grasses or brush understory may have been increased creating transitory range. Cumulative effects, as a result of past and ongoing (private lands) reduction in the tree canopy from windthrow salvage may be a temporary increase in foraging areas and improved access for livestock, although the openings would likely be isolated in areas of non-capable range.

A cumulative impact of the proposed action and these allotments may include a negative effect as a result of higher livestock numbers on these ranges in the past, which may have resulted in higher long-term utilization levels, influencing the range and watershed conditions at a landscape level. Livestock may have impacted key areas and congregation areas such as watering sites, and corrals by causing soil compaction, surface disturbance, direct plant mortality or changes in species composition. Compaction may lead to reduced soil productivity due to reduced water infiltration capacity, reduced available soil water, reduced root growth, and reduced above-ground plant growth. As discussed in the Watershed / Fisheries / Soils section of this document, past grazing activities may have cumulatively contributed to increases in erosion and siltation, affecting current stream and watershed condition. The cumulative effects of potential additional compaction through project activities and grazing are expected to be minimal since only one out of the four allotments is

active, livestock use generally occurs on meadows and riparian stringers which are managed to attain Forest Plan standards and guidelines, and these areas are outside of the proposed treatment areas (RHCAs with mechanical exclusion zones).

Livestock in the Creeks Project area may also contribute to the risk for spreading exotic plant and noxious weed invasions, as discussed in the Noxious Weed Risk Assessment Section of this document. The cumulative effects of continued existing grazing and project activities is potential additional weed spread, although Project Integrated Design Features for noxious weeds would minimize the risk.

Livestock grazing in the active allotments may continue to have a lowered amount of available forage for some wildlife species, as discussed in the Wildlife section of this document. Range activities may cause a minor reduction in forage for deer and other species. Grazing has also increasingly come into conflict with other values such as wildlife habitat, and threatened and endangered species. Livestock grazing may influence habitat suitability, including willow flycatcher habitat.

Recreation trails include the Pacific Crest Trail in two locations and several others. Portions of these trails overlap livestock use areas on the active allotment and the permittee of the active allotment usually contributes to annual trail maintenance. Although most planned treatments are located away from cattle use areas, some treatment areas are located along roads or trails used to move livestock. Impacts from livestock, vehicles, OHV, and recreational stock along numerous roads and trails may cumulatively contribute to surface disturbance and exotic plant spread, as discussed in the Botany and Recreation sections of this document. The level of recreational use within the forest including the Creeks Project area is expected to increase and the cumulative effects of continued existing grazing and project activities is a potential of increased use and impacts to trails.

Private lands associated with allotments have been grazed for many years and utilization levels within these areas may have exceeded Forest Plan Standards (over 40 or 50%). Some areas of privately owned lands are fenced pastures, including those shown in Table 3-80. Grazing of private lands associated with the allotments is expected to continue while the permits remain active. It is unknown whether grazing would be reactivated on private lands within allotments that are currently vacant or not being used.

The potential maintenance of the DFPZs created by the Creeks Project is a reasonably foreseeable action. This maintenance could allow for openings or transitory range to be continued, since maintenance of the DFPZ would be achieved with fire and thinning. The Willow Forest Health Recover Project being planned would also include the west portion of the Soda Creek/North Butte Allotment. This project in addition to the Creeks Project would encompass most of the allotment.

Presently, grazing levels are at their lowest point when compared to historic levels. The livestock industry as a whole has seen decreases in permitted use on federal lands due to a variety of factors. Some grazing operations may be at risk of falling below the minimum level of continuing a feasible operation due to fluctuations in livestock commodity prices, overhead costs for producers, and the consumer marketplace.

At this time there are no existing plans to expand these allotments or increase the numbers of permitted animals on any allotment. With implementation of the Proposed Action, trend in range condition on the allotments is anticipated to remain static overall, with an upward trend anticipated on vacant allotments and static or slight upward trend on active allotments managed to meet Forest Standards and Guidelines. The Allotment Management Plans for the allotments are scheduled to be reviewed and revised by 2006. Depending

on the outcome of review, management goals and objectives may change and result in changes to future management.

Alternative 2 - No Action

Direct, Indirect, and Cumulative Effects to Range

Livestock grazing would continue to be managed and authorized under appropriate management plans, regulations, and other policies. Current grazing management on the allotments is described in the affected environment.

A potential adverse impact to grazing as a result of not implementing DFPZ, area thinning, and underburning could come from a wildland fire. Treatment of the fuel condition to reduce the risk and hazard associated with a wildland fire would not be implemented making the area vulnerable to loss of soil and water quality, should a wildland fire occur.

Available forage within the allotments could be potentially decreased by not implementing the project since dead surface material would accumulate in the forest understory. Grazing and its associated soil disturbance could continue to contribute to soil conditions that would favor conifer seedling establishment, and encroachment would continue in some aspen stands where ladder and canopy fuels were not thinned.

Alternative 14

Direct, Indirect, and Cumulative Effects to Range

On the whole there would not be much difference from Alternative 1 and the effects would be similar except for the reduction and change in type of the treatments. Impacts from treatments within the vacant allotments or to those permittees taking or expecting to take non-use under this alternative would be minimal. Within the active allotment, a lowered reduction in the amount of forest floor material would occur than under Alternative 1, and this may have local effects on forage productivity and livestock access. The active allotment has not been reliant on transitory rangelands. The degree of direct, indirect, and cumulative effects to rangeland resources would be similar to Alternative 1.

Recreation / Visual Resources

Affected Environment

The 2004 Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement and Record of Decision, includes a diverse analysis of recreation opportunities and data on economics, statistics and capacities for the Sierra Nevada National Forests including the Lassen National Forest. The listed activities are examined for the forest and the FSEIS contains data including visitor days of use, expected increase in demand, and direct and indirect economic benefits. The largest recreation complex near the Creeks Forest Health Recovery Project area is associated with the 75 square mile lake Almanor to the east. Lake recreation, fishing and water play activities are supported by public and private family and group campgrounds, boat launches and marina facilities and hiking, bicycling and equestrian trails.

Recreation use is important in the mix of resources provided by the LNF. The 1993 LNF LRMP states goals to provide a wide range of outdoor recreation, interpretive services and facilities, and diverse opportunities for off highway vehicle recreation and winter sports. The project area is located in two management areas (MA): 45-Soda Ridge and 37-Butt Creek.

Management direction specifics for Soda Ridge MA related to trails:

- continue to manage designated OHV routes on Soda Ridge and maintain access to the High Lakes OHV area.

Management direction specifics for Butt Creek MA include:

- development and improvement of trailheads for the Pacific Crest Trail (PCT),
- interpretation of management activities along the PCT
- manage for dispersed use in all areas except Soldier Meadows campground which is managed as a moderate development (level 3) campground.

Recreation Opportunity Spectrum.

The LNF uses the Recreation Opportunity Spectrum (ROS) (USDA FS, 1986) to classify and manage recreation opportunities based on the physical setting, social setting, and managerial setting of the project area. The Creeks project activities are entirely in a Roaded Natural (RN) setting where resource modifications and utilization practices are evident but harmonize with the natural environment (Figure 3-25). This recreation opportunity is measured against the recreational uses within the project area. Since roaded natural allows for modifications to the resources, recreation users are used to seeing the activities proposed in the Creeks project.

Dispersed recreation accounts for the largest amount of recreation activity in the Creeks project area and dispersed use is projected to increase along with forest, State and National trends (CA P&R, 2002). Use during all seasons is high, amounting to about 40 % of total Lassen National Forest recreation with motorized use the most popular activity, followed by fishing, camping, hunting and hiking/walking.

Activities include camping, hunting, fishing, hiking, horseback riding, snowmobiling, OHV use, driving for pleasure/sight seeing, and forest products gathering. Winter snowmobile areas and designated summer OHV riding areas are funded through a partnership with the California Department of Parks and Recreation using a grant program for operation and maintenance of OHV trails and staging areas. Christmas tree cutting is popular, especially within the project area as there is an abundance of small "silvertips" (red fir) close to roads. Picking mushrooms is another forest product gathering activity known to occur when conditions allow. Special

forest product permits are required for gathering forest products but are not a significant source of revenue. Hunting in the project area is primarily for black-tailed deer, black bear and wild turkey. Fishing occurs in most creeks in the project area. Yellow Creek, a designated wild trout water downstream of the project area, and Grizzly Creek receives the most use.

Facilities for dispersed use within the project boundary are few and focused on roads, trails and two dispersed campsites (Little Grizzly and Yellow Creek) that support the dispersed uses.

Developed recreation in the project area is minimal. Soldier Meadows campground in the northeast corner of the project area is a small campground (8 sites) and is the only developed facility within the project boundary. Pacific Gas & Electric's Yellow Creek campground is a moderately developed campground (20 sites) just east of the project area. The highest use period for both campgrounds coincides with the opening of fishing season in the spring and deer hunting season in the fall.

The majority of developed recreation is currently administered under Fee Demonstration Authority but would return to concessionaire management under a Special Use Permit in the foreseeable future.

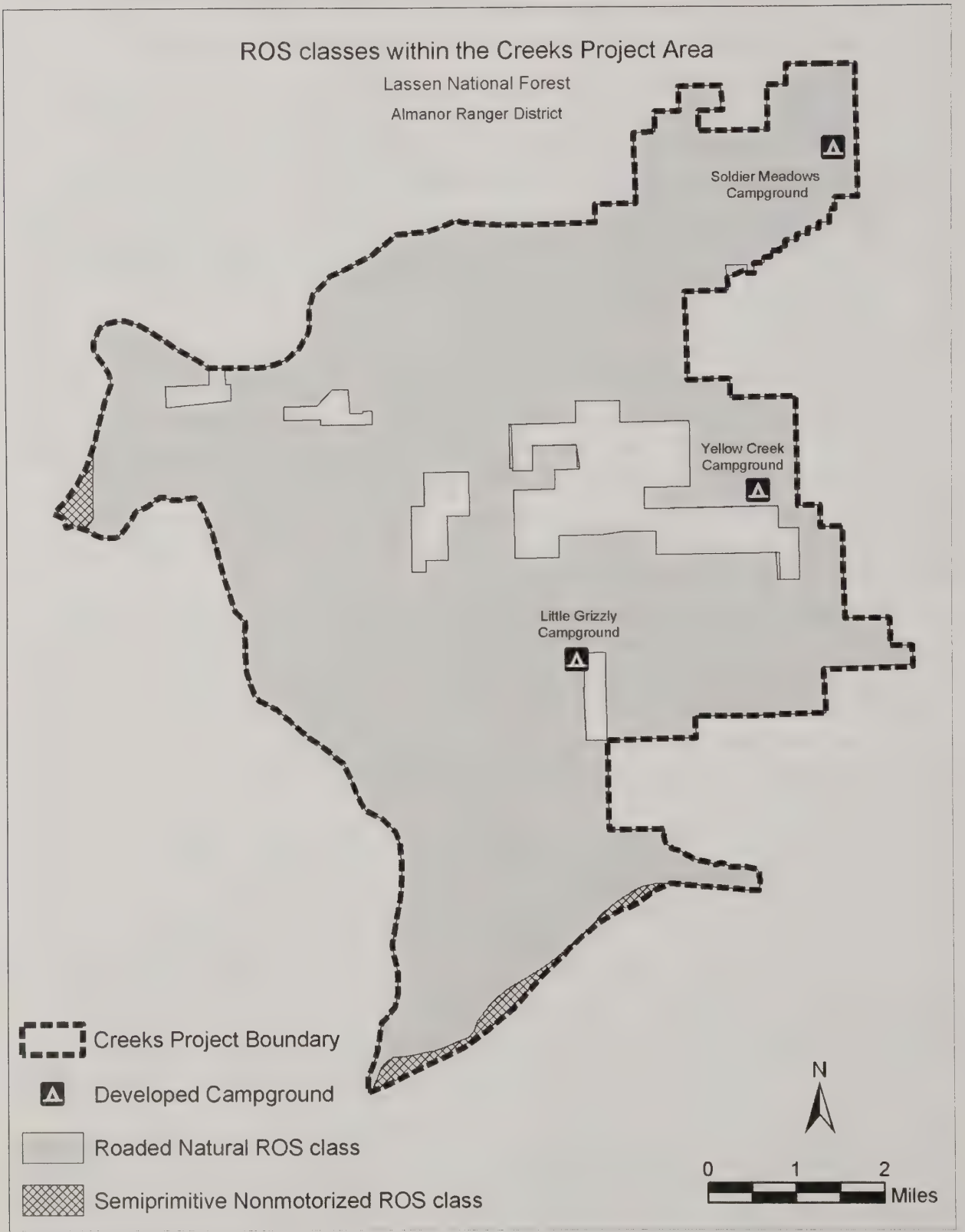
Trails (4.4 miles) wind throughout the project area. The most notable hiking trail is the Pacific Crest National Scenic Trail (PCT) that intertwines the west boundary of the project area. This nationally acclaimed trail is 2,600 miles long extending from Mexico to Canada. The Humboldt Summit and Cold Springs trailheads and 10-12 miles of the PCT are adjacent to the project boundary. Other system hiking trails in or near the project area are the Soda Creek and Grizzly Creek trails. The Peacock Point and Sunflower Flat trailheads (Soda Creek) are within the project boundary.

A portion of the Back Country Discovery Trail (BCDT) passes through the project area on Plumas County road 307 (FS 27N11). Discovery points leave the main route directing vehicular travelers to points of interest. The BCDT was established to provide access to more remote areas of the "back country," generally utilizing gravel and dirt roads and OHV trails with linkages to the Scenic Byways system. They are intended to enhance opportunities for quality outdoor recreation by providing a system of sport utility vehicle (SUV), high clearance and off-highway vehicle roads and trails throughout the forest. Most of these routes are not intended for passenger cars.

Snowmobiling occurs within the project area. The majority of the Jonesville snowmobile trail system (60 miles of groomed trails) is within the project area. The trails are composed of Forest Service (27N04, 27N65, 26N02 and 26N35) and County roads (307 and 308) and are accessed from State Highway 89 along the west shore of Lake Almanor and the Jonesville Winter OHV Staging Area on the Humboldt Road north of Butte Meadows. Trail use consists mainly of individual and club riders. Guided snowmobile trips are provided by one permitted outfitter and guide but do not substantially increase the use level. Limited Operating Periods (LOPs) are imposed on Forest Service roads from December 26th to April 1st annually to facilitate grooming of the snowmobile trails. LOPs may be lifted earlier than April 1st if sufficient snow depth (approximately 18 inches) is not present.

Access for recreation use is mostly from Plumas County Roads 307 and 308 from State Highway 89 on the northeast side of the project and from State Highway 32 via the Butte Meadows and Humboldt Roads (308) on the southwest side of the project. Dispersed use occurs along all roads, as no barriers restrict access or use except those imposed by topography. The forest roads generally are in good condition but some are in fair to poor conditions. There are no contemporary counts of use on these roads.

Figure 3-25. Recreation Opportunity Spectrum (ROS) Classes within the Creeks Project Area



Source: Almanor Ranger District GIS

Visual Quality Objectives

The LNF uses the Visual Quality Management to classify visual resources. There are four Visual Quality Objectives (VQOs) within the Creeks Project Areas: Preservation, Retention, Partial Retention, and Modification. No activities are proposed within Preservation or Retention (Figure 3-26).

The majority of the project area is in the VQO of Modification, where activities in the foreground and middle ground are dominant, but appear natural. Two main corridors, one along Plumas County Road 307 and one along Plumas County Road 308, are in Partial Retention, where management activities should remain visually subordinate. (USDA FS, 1973).

The existing landscape in the project area is natural appearing to the public as a mosaic of differing forest types, grassy meadows, and moderately uneven terrain. The project is in a Forest production/multiple use area with timber and recreation endeavors expected. Past fire disturbances are in part responsible for the mosaic appearance of the project area. Also, past timber harvests have occurred throughout the project area where the age class varies and some plantations of even age trees are scattered in the area, both with large amounts of undergrowth.

Portions of the existing roads and trails in the project area are effectively the viewing platforms, from which to analyze effects. Areas of high interest in visual quality are County Road 307 with it's designation as part of the Back Country Discovery Trail and County Road 308. Both of these roads are designated as, the Pacific Crest National Scenic Trail (PCT) intertwining the west boundary of the project, and Soda Creek trail and trailhead in the south. Other trails are Yellow Creek, Sunflower Flat and Yellow Creek, there are non-system roads, and trails found throughout the unit. 3 loops following County and Forest roads for snowmobile touring called the Jonesville Snowmobile Area are within or adjacent to the project boundary.

Environmental Effects

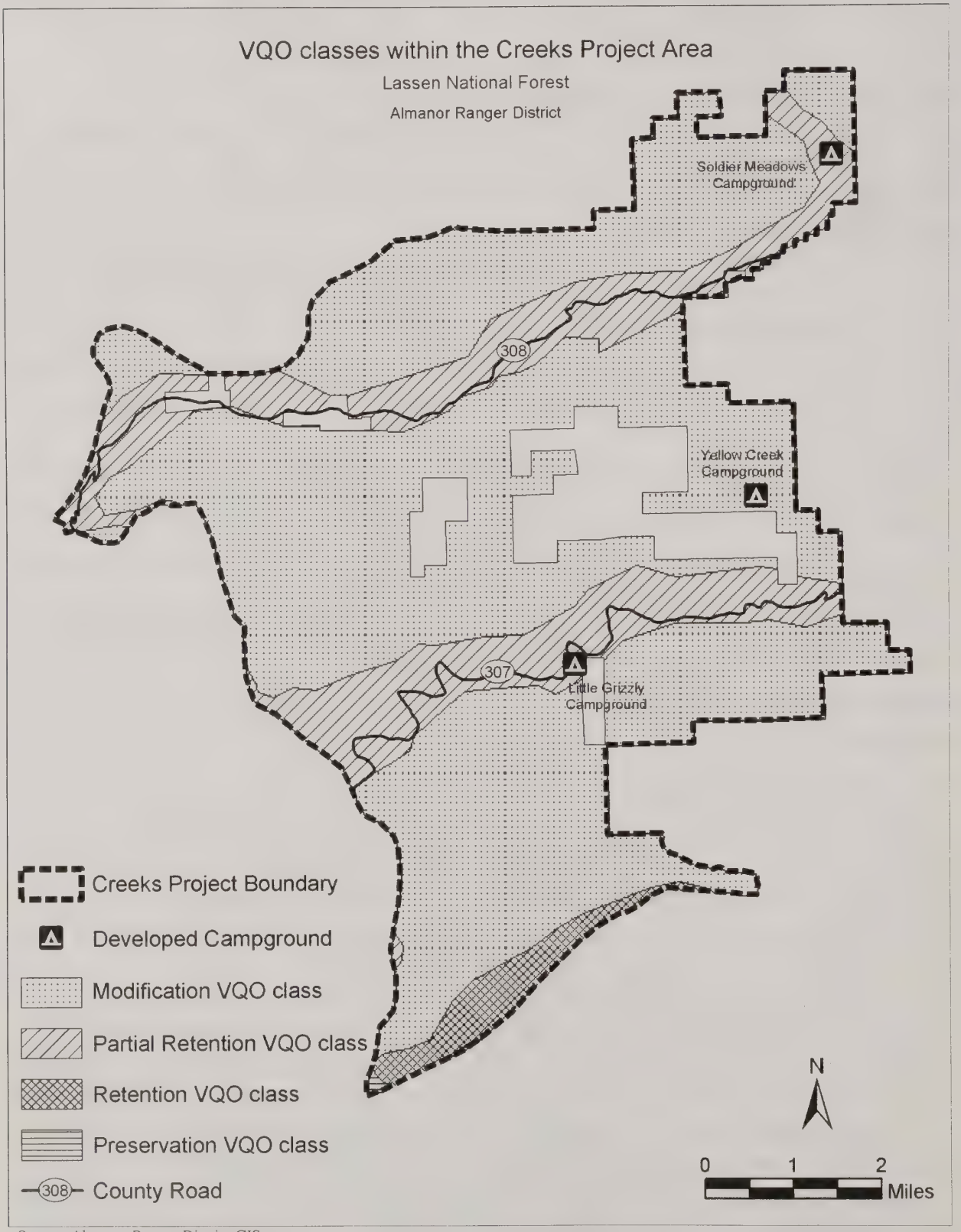
Alternatives 1 and 15

Direct Effects to Recreation

Although there are some differences among the two action alternatives in the intensity of treatment and dropping of some group selection treatments, no real distinction between the alternatives can be made to the recreation resource. Both action alternatives meet the Recreation Opportunity Spectrum and Visual Quality Objects of the 1993 Lassen LRMP as amended. Therefore the effects analysis is so similar that they are discussed together. Figure 3-25 displays the locations of the recreation facilities.

Dispersed recreation – Impacts to visitors that are camping, hunting, hiking, horseback riding, snowmobiling, driving for pleasure, sight seeing, OHV, or forest products gathering are expected to be minimal due to the size of the project area and the inclusion of two watersheds. It is unlikely that a visitor who has been temporarily displaced wouldn't be able to find another suitable campsite within a short distance. The Little Grizzly dispersed site is within a proposed DFPZ, which would necessitate temporary closure of this site. This site is used mostly by hunters in the fall with no more than a half dozen trailers at one time. There are no facilities at the site, therefore, no amenities would be missed. There are no proposed treatments within the Yellow Creek dispersed site. However, there is tractor logging proposed DFPZ adjacent to the site and some noise of heavy equipment working would be noticeable to people in the area.

Figure 3-26. Visual Quality Objectives (VQO) classes within the Creeks Project Area



Source: Almanor Ranger District GIS

Although there are treatments occurring within the RHCAs, impacts to fishermen are expected to be less than general visitors because there are no mechanical treatments within the stream corridors. The largest impact to visitors would be due to the intermittent and temporary increase in large truck and heavy equipment traffic and operations noise.

All of the project area could be temporarily impacted by smoke from prescribed burning operations primarily in the fall. However, after Labor Day, forest visitor use is minimal. Hunters may experience this impact, but would not necessarily use the same areas that are being treated, since game animals would disperse from the area for short periods.

Developed recreation – Impacts to visitors at Soldier Meadows campground are expected to be minimal. There are no proposed treatments in or near the campground. There are three proposed group selections on a ridge approximately 800 – 1,000 feet away. The largest impact to visitors would be due to the intermittent and temporary increase in large truck and heavy equipment traffic and operations noise. All activities adjacent to developed facilities would be signed and controlled to alert the public of potential hazards.

Trails – There are two areas where DFPZs cross the Pacific Crest Trail (PCT), which would cause temporary closures of the two sections. There are several group selections near the PCT, however, they are located far enough away that they would not impede use of the trail. Hikers may hear equipment working in the distance. Portions of the Grizzly Creek and Soda Creek Trails and the Peacock Point Trailhead are within treatment areas. All activities adjacent to developed facilities (trails and trailheads) would be signed and controlled to alert the public of potential hazards. Cut tree marking would be applied within 150 feet of the Soda Creek trail and the PCT. Operations created slash would be 100 percent cleaned up within 100 feet of both trails, the trail tread would be protected and restored at designated crossings.

The Back Country Discovery Trail follows Plumas County Road 307 and would have a short term impact due to the intermittent and temporary increase in large truck and heavy equipment traffic.

The majority of the Jonesville snowmobile trail system occurs within the project area, however, no effect is expected, since winter logging is not a typical practice on the Almanor Ranger District.

Access – Roads accessing the campground, trailheads and trails would be kept open (except for temporary closures) and free of debris. Alternative 1 describes an integrated design feature that would alert the public to potential hazards through signing along Forest system roads. Road 27N65 may be subject to periodic closures for project implementation, and temporary closures of all roads may occur for safety reasons. Safety provisions would be included in project contracts.

Visual Quality Objectives

Partial Retention and Modification - Given that the DFPZ and area thinning treatments occur along Plumas County Roads 307 and 308, this would create a visual effect where management activities would remain visually subordinate to the surrounding landscape. Because there are varying degrees of canopy closure that currently exists along these roads, the basic parameters within which meeting this VQO would be possible. Alternative 1 would maintain a dominance of mature forest character. Alterations proposed would be made in such a way as to minimize their negative contrast with the landscape and move the stand toward its desired long-range goal. Slash and other logging debris would be eliminated so as not to be visually evident. Some stumps may be visible in the foreground, however, as vegetation regrows, the negative effect would lessen.

Vegetative patterns of the thinned stands within the DFPZs and the Area Thinnings include a mosaic of differing forest types, grassy meadows, and moderately uneven terrain. Some areas have a continuous canopy with some patterns of openings. Small openings would be created which would repeat the existing forms, colors and texture of the openings. Uncut segments, giving the more natural landscape appearance, would also break up cutting along the roadside frontage. Establishing vegetation after treatment both by natural regeneration and vegetation understory vegetative growth as well as reforestation would reduce exposed soil.

Some groups would be established within the DFPZs. Most cutting units should be located behind vegetative screens. For those that would be visible to the vehicle-oriented observer, the irregular edges used to define the groups would softened and blend with natural openings and landforms in the middle and fore ground. In addition, after slash disposal, the groups are planted to assure prompt regeneration. This will begin the transition zone to soften the coarse edge of the residual trunks.

A few groups could be visible from the Pacific Crest Trail, however; they would be on the slope below the observer eye level. In this case, most cutting units would have vegetative screens in the foreground as they are looking down upon them. They would appear as natural openings, but in some instances appear clustered together. The irregular edges used to define the groups would softened and blend with natural openings and landforms in the middle and fore ground as noted above. In addition, after slash disposal, the groups are planted to assure prompt regeneration.

Indirect Effects to Recreation

Long-term effects of the project would be an improvement to the over all health of the forest and safety from wildfire thereby improving recreation opportunities in the future. People familiar with the area, especially those who return each year such as hunters and anglers would be most aware of any limitations to recreation activities during project implementation. New or occasional visitors would be less aware of changes. Design features would lessen the short-term effects to recreation.

Cumulative Effects to Recreation

The cumulative effects analysis boundary goes outside the project area and follows the Pacific Crest Trail (PCT). Figure A-11 displays this area (Appendix A). Although the Creeks Projects only intersects the PCT in two locations, some view points along other portions of the trail, ie. west and north sides of the project area, are visible. A viewshed analysis was conducted between DEIS and this FEIS. The results of this model showed much of the landscape to be within the view of the PCT. However, the model only accounts for terrain features and not for features on the landscape that my block visibility, such as trees, rocks, down logs, canopy cover etc. As such the model does distort the real site distance from the trail. Several areas were then field verified to determine the validity of the model. At most points along the trail it was noted that site distance was actually 250 feet from the trail, obscuring any real vista points that would show the activities being proposed under both action alternatives. However, since some of the Creeks project could be viewed along the trail, it was necessary to bring the cumulative effects boundary to the PCT.

The Creeks Project area has a long history of vegetation management projects. Impacts to visitors have been well mitigated and complaints are rare. The recreating public appears to be satisfied with their recreational experiences as they enjoy the project area. No public complaints or suggested changes in management have been requested to date. Occasional requests for Special Use Permits or recreation facility

improvements are received and acted on if they are feasible and in compliance with the 1993 LNF LRMP as amended. Once the treatments have been completed, the recreating public would be able to enjoy their uses as before. Therefore, little or no cumulative effects would occur to recreation activities.

Alternative 2 – No Action

Direct and Indirect Effects to Recreation

The No Action Alternative would result in no immediate or foreseeable change to existing dispersed or developed recreation activities and visitors use of the roads and trails.

No action would result in any immediate, discernable change to the visual resource and little perceived change for years. If no disturbance events occur over the next 20 to 30 years, the mixed conifer and fir communities would continue to be dominant the landscape and increase in density further reducing scenic variety and diversity. With no reduction in the risk of wildfire to this forest area, effects to the scenery would take place if a large-scale wildfire (beyond expected disturbance levels in this ecological unit) were to occur. Depending on the scale, wildfire could permanently change the vegetative composition of the forest resulting in scenery with very negative appearance for 3 to 10 years and a different type of scenic expression thereafter.

Cumulative Effects to Recreation

With no reduction in the risk of wildfire to this forest area, effects to all types of recreation activities would take place if a large scale wildfire were to occur due to continued buildup of debris, brush and ladder fuels. Depending on the scale of a wildfire, it could cause some temporary or long term closures and inconvenience to the recreation user, or in the worst case, fire damage to the forest could be extreme and take several decades to recover. In this scenario, many visitors would be displaced.

Disclosures

NEPA requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). As declared by the Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line rights-of-way or road.

Silvicultural Resources

Short-term Uses and Long-term Productivity - DFPZ and area thinning would reduce competition for resources, which would improve overall stand growth and vigor and reduce individual tree mortality; stand densities would decrease as a result of treatments. Thinning would target the removal of damaged and diseased trees and favor retention of trees free of damage and defect. These treatments would increase the species composition of fire resistant trees such as sugar, ponderosa, and Jeffrey pine. Proposed treatments would retain or promote a higher component of pine within mixed conifer and white fir stands. Lower stand densities in the thinned stands would also promote the health of pine, since pine do not grow at the higher stocking densities that white and red fir can persist at. Open stands dominated be larger trees with relatively few scattered understory trees and regeneration are conditions that support low to moderate intensity ground fires. Treated stands would be more resistant to insect attack due to decreased stocking. Group selections would promote the regeneration of pine species and provide stand structure diversity. Forest composition and structure would move closer to desired conditions.

Unavoidable Adverse Effects, Irreversible or Irretrievable Commitments of Resources - There are no unavoidable adverse effects or irreversible commitments of resources expected for silvicultural resources. The group selection harvest of small old forest areas or individual old trees represents an irreversible commitment of resources.

Fire / Fuels / Air Quality

Short-term Uses and Long-term Productivity - DFPZ and area thinnings would reduce hazardous wildland fire behavior from fires both originating within treatments and from outside point sources (Graham et al., 1999). Treatment of surface, ladder, and canopy fuels would further help protect communities and resources in and around the DFPZs and area thinnings, while increasing safety for firefighters.

Reduction of surface fuels moderates surface fire behavior, allowing for direct attack by hand crews and fire engines. Thinning treatments would reduce wildfire from passive crowning to surface fires in many of the stands. After treatment, reduction in rate of spread means that the fire in the treated areas would be smaller when crews arrive and would be moving slower.

With adherence to a smoke management plan, particulate matter emissions from pile or understory burning would not violate California Ambient Air Quality Emission Standards. Short duration production of smoke and associated emissions would occur during pile and understory burning. Treatment of fuels under the Proposed Action would result in decreased smoke production and associated emissions in the event of a wild fire.

Unavoidable Adverse Effects - Several communities lie within proximity of the areas where both pile and prescribed burning is proposed to occur. Adherence to the smoke management plan for pile and understory burning would alleviate negative impacts to communities. By adhering to a smoke management plan approved by the Lassen National Forest Supervisor and the Northern Sierra Air Quality Management District, particulate matter emissions from pile or understory burning would not violate California Ambient Air Quality emission standards. Short duration production of smoke and associated emissions would occur during pile and understory burning.

Irreversible or Irretrievable Commitments of Resources - There are no irreversible or irretrievable commitments of resources expected for fuels resources

Wildlife

Short-term Uses and Long-term Productivity on Vegetation - Stand structure would tend to be more homogenous post-treatment. Stand heterogeneity and complexity would likely decline, particularly in stands with CWHR values at or above 3M and particularly within the DFPZs. The group selections would result in a complete change of vegetative structure and would increase the landscape heterogeneity as early successional habitat is generally poorly represented as a component of the landscape.

Thinning stands would increase the tree growth rates and increase conifer diversity. The addition of group selections would further add a complexity by introducing either pockets of younger trees or shrubs, or both. Thinning older stands that have less density and have two or more cohorts are not likely to have an increase in complexity or heterogeneity.

Short-term Uses and Long-term Productivity on Snags and down wood - There would be a general reduction in the number of snags within the areas treated, including along roads used during the life of the project. Project designs, including stand layout, are such that pockets of new snags would be retained where they do not compromise safety. Although it is impossible to predict the level of snag recruitment, it is estimated that the project design criteria would not substantially affect current snag levels within the treated areas as a whole and that snag numbers (particularly decay classes 1 and 2) would continue to increase within the project area.

Short-term Uses and Long-term Productivity on the California spotted owl - The impacts to spotted owls would primarily be through the reduction in the amount and value of suitable habitat. Although PACs would not be treated, most of the home ranges would see a general reduction in the amount and value of suitable habitat due to a loss of stand complexity as well as a general decline in decadence. The DFPZs would generally be thinned below the canopy level considered necessary for suitability (40 to 50%). Area thinning and group selection activities would affect approximately 10% of the project area and about 32% of the existing suitable habitat. Impacts to nesting individuals are mitigated through the implementation of LOPs around active nest sites. Because the majority of the prescriptions would retain some level of canopy cover,

Alternative 1 would not preclude dispersal from one territory to another, nor would the treatment preclude territory development in the future although there is a potential lag time (2 to 3 decades) before a currently unoccupied home range becomes sustainable based on the current understanding of habitat needs for this species.

DFPZ and thinning prescriptions A, C, F, G, and H would result in lowered habitat values, although the stands would remain suitable. Habitat value reductions are primarily due to reductions in the overall amount of canopy cover, a decline in the amount of decadence, and a decline in stand heterogeneity as was described in the discussion of vegetative attributes and the silvicultural section of this document. Prescription A removes small fuels but would retain the existing overstory canopy with a resulting impact of lower habitat values only slightly through loss of structure, specifically through the reduction of snags and decadent live trees and loss of habitat associated with developing the infrastructure (skids, landings, temporary roads) needed for the project. Prescription B is expected to reduce suitable habitat to an unsuitable condition primarily due to reducing canopies below 40% as well as the reductions in stand heterogeneity. Assuming no further affects to habitat, the habitat values in any thinning prescription would slowly improve in the next for two to three decades as canopy cover and other structural attributes naturally evolve. At the end of that time, habitat values are likely to be better than if left untreated as the stand would develop a second cohort of trees providing more stand heterogeneity than would otherwise occur especially within the denser, younger stands.

The project is not likely to result in measurable impacts to the species although there would be impacts to the amount of suitable habitat within home ranges treated under this project. The group selections would completely remove suitable habitat and the loss would remain for at least 80 to 120 years).

Short-term Uses and Long-term Productivity on the Northern goshawk - Alternative 1 would have minor to moderate impacts through changes in structure with very little change in habitat suitability. The affects to habitat can include a decline in the amount of decadence and loss of stand heterogeneity due to concentrating on the removal of the lower size classes within the treated areas.

Treatments within habitat having canopy closures greater than 60% would result in a decline in suitability as nesting habitat but remain moderately useful for foraging. Those areas within the PFA treated through area thinning and DFPZ prescriptions A and C would return to current canopy cover densities within two to three decades and treatments would not provide a change in habitat suitability sufficient to preclude nesting or foraging in the future. Prescription B is estimated to acquire suitable nesting habitat attributes after three to five decades, but would continue to provide moderate foraging habitat. While Prescription B may reduce foraging habitat value, the treated areas would improve over time as canopy densities increase and in one decade may have higher foraging habitat value due to a reduction in the dense understory.

Short-term Uses and Long-term Productivity on the Willow flycatcher - The project would have little impact on the willow flycatcher as the project limits affects to riparian habitats such as those associated with the willow flycatcher. Any removal of conifers near meadow habitat would benefit the willow flycatcher, as it would limit perches for predators. Since conifers can have an adverse affect on meadows (changing hydrology, shading riparian hardwoods), the reduction of conifers along the edge or within the meadow system would be considered a positive outcome.

Short-term Uses and Long-term Productivity on the Marten - The proposed treatment areas affect approximately 40 to 45% of the area most used by marten within the project area based on survey results and

habitat preference. The treatment would reduce the utility of the treated area in a manner that may affect the number and size of the territories or home ranges supported within the project area. Assuming the current condition supports a mixture of habitat with moderate to high habitat value, thinning would reduce the habitat values in certain areas due to the associated canopy loss and slight potential decrease in snags and down wood material that is an essential component of subnivean (under snow) foraging. While the area thinnings are expected to result in stands that have greater than 40% canopy they would not approach the preferred 60% canopy cover for one to two decades.

Within the treatment areas (DFPZ, Area Treatments, and group selections), high quality suitable habitat would be reduced from 5,842 acres to 3,186 acres post treatment, reducing the amount of suitable habitat by almost half within the treated areas. Across the entire project area, high quality suitable habitat would be reduced 4% post-treatment from 17,693 acres to 15,034 acres. Fifty-nine percent of the total land base is currently considered moderate to high quality habitat. Project implementation would reduce the total to 50% post treatment. These data were considered across the project area and it is likely that there are minor affects to an unknown number of home ranges, and while cumulatively there is a net loss of suitable habitat, it appears the impact to any given home range would be limited and not sufficient to cause an abandonment or result in a loss of connectivity between areas of suitable habitat.

Short-term Uses and Long-term Productivity on the Pallid bat - There is the potential for the loss of existing roost trees during operations; however, since it is unlikely this species is present in more than very limited numbers due to the lack of habitat, the risk is low. Overall, effects to this species, both positive and adverse, are limited and the risk to the species and individuals is low.

Short-term Uses and Long-term Productivity on Mule deer - The proposed thinning treatments would not lead to any meaningful increase in forage, as the stands would generally remain too dense for a meaningful increase in shrub or herbaceous growth, although some small gains in openings (skid trails, landings) may occur. Group selections would provide some increase in forage; however, the groups are not large enough to provide long-term gains and may be too small for shrubs to develop. Eventually, natural regeneration of conifers would supplant the shrub and herbaceous cover.

The project area would retain only moderate habitat value due to the continued limiting forage and high road densities in most areas. Even though this meets Forest direction, habitat values would continue to decline over time. Because the overall project would result in a slight improvement initially, the project is not likely to impact current population trends. The project would have no measurable affect on population trends as deer might only be indirectly affected by implementation and improvements in forage are not enough to offset conditions elsewhere throughout the summer range.

Short-term Uses and Long-term Productivity on Black bear – Black bear are habitat generalists and can utilize a wide range of habitats. Since there is little expected change of habitat attributes within the project area, there would be no measurable risk to species from implementation of Alternative 1. The risk to the species is considered very low and population trends would not be affected.

Short-term Uses and Long-term Productivity on the Hairy woodpecker - While the stands being treated contain the larger trees favored by this species, the dense canopies (exceeding 50% in many cases) reduce the suitability of the habitat. Thinning is expected to reduce the stand densities, an action that would favor this species. Snag data indicates that at the landscape level the project area provides low habitat value

due to the general paucity of hard snags. The retention of hard snags (anticipated to be approximately 2/acre within all treated areas combined) would increase the overall number of snags, improving foraging conditions and future nesting habitat (soft snags). The retention of snags at predicted levels, and in groups as specified in the snag integrated design features, provide habitat attributes that favor this species. Population trends would remain unaffected by the project; or if affected, positively so.

Short-term Uses and Long-term Productivity on the Pileated woodpecker - This project is not expected to have measurable impacts to the species. There would be little change in cover values and the thinned stands would remain above 25% canopy cover. The group selections affect a very limited area overall and are distributed in a manner that would minimize the impact to any existing territories. Snag levels needed to meet suitability standards (at least one/acre over 20 inches dbh) would not be compromised. Because the project would have little impact on the amount of moderate and high quality habitat within the Forest, the overall project is not expected to affect this species or population trends on the Forest.

Short-term Uses and Long-term Productivity on Peregrine Falcon - Given that the project would not affect the nesting habitat (rock bluffs) and that limited operating periods would be used to limit disturbance during nesting, there would be no predictable direct impact to the species. The project may have limited impacts to prey species although overall, habitat value would marginally improve for prey, primarily due to edge creation within the group selections. There may be some disturbance during project implementation for foraging falcons.

Short-term Uses and Long-term Productivity on Migratory Landbirds - The project is not likely to have a measurable affect on migratory bird species. However, it is likely local populations would initially decline within the treatment area. While several species are positively correlated to conifers, few are positively correlated with dense canopies and large (>24 inches dbh) conifers. The temporary reduction of shrubs would pose a risk to individual reproduction due to loss of nesting sites, but the acres of shrubs affected are a very small component of the project, therefore, the risk is low for shrub-adapted species. Since meadow and riparian habitats would remain largely unaffected, the impact to the majority of species and individuals would be largely avoided.

Unavoidable Adverse Effects - California spotted owl suitable habitat treated within the DFPZ Prescription B would become unsuitable due to loss of canopy cover (below 40%). Reductions in decadence (snag and down logs) could adversely affect some populations of common prey species such as woodpeckers, squirrels, and small birds.

Group selections can increase landscape heterogeneity and increase the foraging habitat potential of an area for American marten. However, when concentrated within suitable habitat the benefits of adding heterogeneity may be outweighed by the negative impacts of fragmenting the landscape. Determining what percentage of the landscape groups could alter before marten are adversely affected is difficult to determine. The lack of a site-specific threshold provides a level of uncertainty in determining the effects of creating additional openings on the landscape. The Proposed Action would almost double the amount of landbase that lacks cover, increasing the percent from 5% to 9%.

Irreversible or Irretrievable Commitments of Resources - There are no irreversible or irretrievable commitments of resources expected for wildlife resources.

Short-term Uses and Long-term Productivity - The risk of negatively affecting soil productivity is low for the proposed project activities. The project would be implemented with integrated design features designed to avoid or reduce the potential negative effects of the proposed activities on soil resources (Integrated Design Features, Chapter 2). By limiting and designating the number of skid trails, soil compaction would not exceed 10 percent of any activity area. Existing compaction would be reduced by decommissioning all temporary roads (many are existing unclassified roads) utilized during timber harvest following project activities.

Based on a combination of field surveys and estimates of cumulative disturbance using equivalent roaded acres (ERA), soil quality guidelines for Soil Hydrologic Function would be met in all project subwatersheds, as would soil productivity standards.

No new channel crossings would be constructed. Four crossings on existing non-system roads would be removed when these roads are decommissioned. Two of these crossings are in the Grizzly Creek watershed; the others are in the Fanani (lower Butt Creek) and Shanghai sub-watersheds. Removal of the crossings would result in a short-term increase in sediment in stream reaches below these crossings. Removal of the crossings would result in long-term reduction in sediment delivery at the sites and would benefit aquatic habitat. Therefore, our expectation is a long-term decrease in sediment delivery as a result of the proposed action. In the short term, the time during which roads are used for haul, it is expected sediment reductions from road surface and road surface treatments at crossings would be balanced by increases due to road maintenance.

Prescriptions for treatments within RHCAs are designed to improve stand condition and promote long-term health of the drier mixed conifer type vegetation. The effects of the Storrie Fire (2000) on some riparian zones suggest that stands more resilient to wildfire would better meet riparian management objectives in the long term. Field observations of the Storrie Fire showed a range of fire intensities and effects. In lightly and moderately burned areas, fire effects were either beneficial (in terms of removing fuels and thinning stands) or produced short-term detrimental effects (loss of ground cover soon replaced by needle fall). In areas with high intensity burns, effects were detrimental. Ground cover was removed and vegetation was killed. Stream shade was nearly completely removed, and large and small organic material was eliminated.

In the short term, small woody material would not be available for recruitment. In the long term, treated stands would produce larger recruitable trees. Therefore, the likely result is a possible reduction in the number of trees recruited to channels, followed by a long-term increase in the volume of recruited material.

There is a low risk that the Proposed Action would contribute toward adverse cumulative effects to rainbow trout. There is some risk of increases in short-term sediment delivery, especially in the Grizzly creek. This risk would be largely or completed offset by treatment of existing erosion sources. Therefore, the expectation is for a slight decrease or no change in sediment delivery in the short term, with a decrease in sediment delivery in the longer term. Therefore, any short term delivery would be expected to be minor, and of short duration and not expected to adversely impact the long-term rainbow trout habitat condition in the project area. Overall, effects of the project would not be expected to result in a reduction in population or distribution of rainbow trout.

The proposed actions were designed to minimize potential adverse impacts to aquatic habitat within the project area in recognition of existing watershed conditions due to lasting impacts of the Storrie fire, high road densities and high number of road crossings. Based on the results of the CWE analysis, implementation of

BMPs and integrated design features (including RHCA designations and prescriptions), the risk of adverse cumulative effects to aquatic resources within the project area is low and beneficial uses of would be maintained. The analysis concluded that there is no loss of aquatic/riparian habitat and therefore there is no cumulative contribution to the loss of suitable habitat for aquatic and riparian dependent species within the HFQLG Pilot Project Area.

Unavoidable Adverse Effects, Irreversible or Irretrievable Commitments of Resources - There are no unavoidable adverse effects, irreversible, or irretrievable commitments of resources expected for watershed/fish/soils resources.

Botany

Short-term Uses and Long-term Productivity - Activities occurring above fens, such as timber harvest and road or trail cuts, could alter the hydrology of fens. Integrated Design Features for wet meadow (fen) habitats for this project were created specifically for these habitats within the project area to ensure that these effects do not occur. Another potential indirect effect is an increase in noxious weeds or other undesirable non-native species as a result of project activities. The standard practice of equipment cleaning and Integrated Design Features of avoiding or treating noxious weed infestations within the project area, particularly those located outside of RHCA inner zones would reduce potential effects.

There may be beneficial indirect effects from implementation of the Proposed Action since treatments in stands surrounding RHCAs would help to reduce the threat of a catastrophic wildfire. While many riparian habitats, wet meadows, and fens where willows, cottonwoods, alders, and aspens are found are potentially protected from wildfire by the wet habitat they exist in, narrow riparian corridors can be susceptible, and while most riparian hardwoods would resprout after a fire, an intense hot fire can kill these species particularly alders. Thinning of overstocked stands adjacent to these areas would help to reduce the severity and the potential for wildfire fire to impact these areas in the future.

Unavoidable Adverse Effects, Irreversible or Irretrievable Commitments of Resources - There are no unavoidable adverse effects, irreversible, or irretrievable commitments of resources expected for botany resources.

Economics

Short-term Uses and Long-term Productivity - The implementation of the Proposed Action provides public benefits such as local jobs, income generated from the forest products industry, and energy from local cogeneration plants.

Unavoidable Adverse Effects, Irreversible or Irretrievable Commitments of Resources - There are no unavoidable adverse effects, irreversible, or irretrievable commitments of resources expected for economics resources.

Heritage Resources

Short-term Uses and Long-term Productivity - There is the potential that sites (Unanticipated Discoveries) do exist that are currently obscured by vegetative cover. Unanticipated Discoveries are to be mitigated using the terms of the Interim Protocol. Sites with a high probability to be adversely affected by this project are in the process of being evaluated for National Register eligibility.

Unavoidable Adverse Effects - In the past, heritage sites have been lost to wildfires. Sites within the current project area would be adversely affected by high-intensity wildfire. Under the Proposed Action alternative, fewer sites would be lost from wildfire due to the removal of hazardous fuels. Known sites would receive protection from project activities. Therefore, there would likely be small, beneficial cumulative effects from the proposed project on heritage resources.

Irreversible Commitments of Resources - Irreversible commitments could consist of irreparable disturbance to heritage resources such that values are permanently lost.

Irretrievable Commitments of Resources - Irretrievable commitments could consist of cultural heritage resource disturbance that would preclude further study and documentation.

Range

Short-term Uses and Long-term Productivity - Under Alternative 1, grazing on the active allotments (Soda Creek/North Butte) is expected to continue at current levels, which is at its lowest point when compared to historic levels. Impacts from this alternative would be minimal to the vacant allotments or to those permittees taking or expecting to take non-use. This alternative could have a positive effect on rangeland availability and health by creating additional forage within the treated areas. Forage production and accessibility could be increased on up to approximately 10,600 acres within the allotments, and new areas of transitory range could be created which could improve livestock distribution and use patterns.

Unavoidable Adverse Effects, Irreversible or Irretrievable Commitments of Resources - There are no unavoidable adverse effects, irreversible, or irretrievable commitments of resources expected for range resources.

Recreation / Visual Resources

Short-term Uses and Long-term Productivity - Long-term effects of the project would be an improvement to the over all health of the forest and safety from wildfire thereby improving recreation opportunities in the future. People familiar with the area, especially those who return each year such as hunters and anglers would be most aware of any limitations to recreation activities during project implementation. New or occasional visitors would be less aware of changes. Design features would lessen the short-term effects to recreation.

The Proposed Action would maintain a dominance of mature forest character. Alterations proposed would be made in such a way as to minimize their negative contrast with the landscape and move the stand toward its desired long-range goal. Slash and other logging debris would be eliminated so as not to be visually evident. Some stumps may be visible in the foreground, however, as vegetation regrows, the negative effect would lessen.

Wildfire could permanently change the vegetative composition of the forest resulting in scenery with very negative appearance for 3 to 10 years and a different type of scenic expression thereafter. Alterations proposed would be made in such a way as to minimize their negative contrast with the landscape and move the stand toward its desired long-range goal and prevent catastrophic, wildfire induced changes to the long-term visual condition.

Unavoidable Adverse Effects, Irreversible or Irretrievable Commitments of Resources - There are no unavoidable adverse effects, irreversible, or irretrievable commitments of resources expected for recreation resources.

Other Required Disclosures

NEPA at 40 CFR 1502.25(a) directs "to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with …other environmental review laws and executive orders." Following is the list of the other agencies consulted:

- U.S. Fish and Wildlife Service under the Fish and Wildlife Coordination Act for causing water to be impounded or diverted. No water is proposed for impoundment or diversion for this project, therefore consultation with US Fish and Wildlife Service was not required.
- National Historic Preservation Act for causing ground disturbing actions in historical places. (California State Historic Preservation Office [SHPO]). No historic properties would be affected by the project, therefore, consultation with SHPO is not required.
- U.S. Fish and Wildlife Service and the National Marine Fisheries Service in accordance with the ESA implementing regulations for projects with threatened or endangered species. **Terrestrial wildlife species:** No Threatened or Endangered or proposed (TEP) terrestrial wildlife species would be affected by the project, nor would any federally designated critical habitat be affected, therefore consultation with US Fish and Wildlife Service was not required. **Aquatic Species:** There are no TEP fish species, or critical or essential habitat within the project area, therefore consultation with US Fish and Wildlife Service or the National Marine Fisheries Service was not required. The US Fish and Wildlife Service did review the site-assessment for California Red-legged frog prepared for this project. **Botanical Species:** There are no TEP botanical species, or critical habitat within the project area, therefore consultation with US Fish and Wildlife Service was not required.
- Any applicable state and county laws affected by the alternatives. The Creeks Project area lies within the both the Plumas County Northern Sierra Air Quality Management District (NSAQMD) and the Butte County Air Pollution Control District (ACPD). As a matter of regional policy, a smoke management plan would be submitted for approval by involved agencies prior to any burning that would occur within the Creeks Project area.

Chapter 4. Consultation and Coordination

This chapter contains two sections, 1) the preparers and contributors and 2) the distribution list. Both of these sections apply to the draft and final environmental impact statements.

Preparers and Contributors

The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes and non-Forest Service persons during the development of the draft and final environmental impact statements:

- USDI Fish and Wildlife Service, Sacramento, California
- Almanor Basin Fire Safe Council, Chester, California
- Consultation and Coordination with Indian Tribal Governments, Executive Order 13175 of November 6, 2000. The Lassen National Forest has developed consultation protocol agreements with two tribes with interests in the area and is in the process of developing protocol Memorandums of Understanding with other tribes with interests in Forest activities. The agreements detail actions to follow for consultation of proposed actions. For the Creeks Forest Health Recovery Project, consultation and coordination with tribal governments began in a letter dated April 20, 2004. This letter notified the tribes of planned archaeological site investigation and requested information regarding areas of religious or cultural importance. In April of 2005 a second letter was sent also notifying the tribes of further planned archaeological site investigation and again requesting information regarding areas of religious or cultural importance. Scoping letters were sent to tribal governments on June 4, 2004 and on February 24, 2005 informing them of the proposed action and requesting comments. The Draft EIS for the project was mailed to tribal representatives concurrent with the publication of the Notice of Availability in the Federal Register. Forest Supervisor, Laurie Tippin, met with the Pit River Tribal Council on November 9, 2004, with the Susanville Indian Rancheria on November 10, 2004, and with the Greenville Rancheria on November 2, 2004. She discussed projects listed on the Lassen National Forest's Schedule of Proposed Action with the tribal representatives. None of the tribes expressed interest or concerns about the Creeks Forest Health Recovery Project during those meetings.

The following is a list of contributors, writers, and editors, to the draft and final environmental impact statements:

Janie Ackley - Recreation Specialist

Janie has been with the U.S. Forest Service for 20 years. She has been the District Recreation Officer on the Almanor Ranger District for the last five years. She is currently taking classes towards a Bachelor of Science degree in Recreation and Natural Resource management.

Robin Bryant - Forester

Robin has a Bachelor of Science degree in Forestry, with an emphasis in Forest Production, from Humboldt State University, Arcata, California. Robin has 21 years experience in forest management with the US Forest Service. Robin has been a Forester and Project Leader on the Lassen National Forest for 16 years.

Tiffany Cattau - Fish Biologist (Timber Experts and Measurement Specialists (T.E.A.M.S))

Tiffany has worked the U.S. Army Corps of Engineers as a project manager for the wetlands and waterways division in the Omaha District, Nebraska Field Office. With T.E.A.M.S, Tiffany has worked in Regions 2, 4, 5, and 8. She has a Bachelor of Science in Biology and Chemistry from Wayne State College and a Master of Science degree in Ecology from the University of Nebraska.

Matt Cerney – Fire/Fuels Specialist

Matt holds a Master of Science in Forestry from the California State University at Humboldt (1999) and a Bachelor of Arts in Psychology from the California State University at Sacramento (1988). Since 2004, he has worked as a Fuels Planning Officer at Lassen National Forest's Almanor Ranger District. Prior to that, he worked as a fuels technician for the District. From 1999-2001, he served as a Field Research Forester at Seattle's Pacific Northwest Research Station. From 1997 thru 1999, he worked as a Forestry Technician at Lassen National Forest's Hat Creek Ranger District.

Dominic Cesmat – Forester, Editor/Writer

Dominic holds a Bachelor of Science degree in Forest Resource Management from Humboldt State University, California. Since 1985 he has worked as a Planning Forester on the Beckwourth Ranger District of the Plumas National Forest, and the Almanor and Eagle Lake Ranger Districts of the Lassen National Forest. He has 27 years experience with the Forest Service. He also has experience in timber sale preparation and timber sale administration.

Michael Derrig – Soil/Water Specialist

Mike is a hydrologist who has 20 years of experience with the Forest Service in watershed and soils. He has worked on the Klamath, Plumas, and Olympic National Forests as well as the Pacific Southwest Forest and Range Experiment Station and the Lake Tahoe Basin Management Unit. He is currently the District Hydrologist for the Lassen National Forest, Almanor Ranger District. He has experience in engineering design and contract management and has authored professional papers on water quality and road management. He has traveled on international assignments and recently provided assistance to the Marin Municipal Water District on reducing sediment sources from roads and trails. He has a Bachelors Degree in Geology with a Degree Minor in Natural Resources from Humboldt State University.

Marti J. Dodds - Landscape Architect (T.E.A.M.S)

Subcontractor with Recreation Solutions, a USDA-FS R5 Enterprise Business Group. Marti was a Forest Landscape Architect for 11 years in USFS Region 3. Marti has a Bachelor of Arts degree in Architecture from the University of New Mexico.

Theresa Frolli – Lassen National Forest Planner

Theresa holds a Master of Arts degree in Geography (Geographic Information System) from California State University – Fresno and a Bachelor of Science degree in Rangeland Management from the University of Wyoming. Theresa is currently the Forest Planner for the Lassen National Forest, and recently served as the NEPA Coordinator for the Herger-Feinstein Quincy Library Group Pilot Project Implementation Team. She

has worked for the USDA Forest service for 24 years, with the last 16 years in resource planning and has worked at eight National Forests within four regions.

Stephanie Gripne - Economics and Social Analyst (T.E.A.M.S)

Stephanie is a Boone and Crockett Fellow at University of Montana working on a PhD in Forestry with an emphasis in sociology and economics. She holds a Bachelor of Science Degree in Wildlife Management and Biology from the University Wisconsin-Stevens Point. She also has a Master of Science degree in Ecology from Utah State University.

Greg D. Lind – Interdisciplinary Team Leader (T.E.A.M.S)

Greg has been with T.E.A.M.S since 2001. Prior to T.E.A.M.S, Greg worked on the Boise National Forest, where he was a District Botanist and a District NEPA writer/editor. Greg has a Bachelor of Science Degree in Botany from North Dakota State University. He has held Forest Service and BLM positions since 1979.

Glen Lewis - Fuels Specialist (T.E.A.M.S)

Prior to T.E.A.M.S, Glen was as a fire/fuels specialist on the Northern Hills Ranger District of the Black Hills NF. Glen began his career in the Forest Service in 1989. He has experience in recreation, timber, and fire suppression.

Cavan Maloney - Hydrologist (T.E.A.M.S)

Prior to T.E.A.M.S, Cavan was on the Boise National Forest as a District Hydrologist since 1997. Cavan has had many seasons of experience in forest management projects, water quality issues, watershed rehabilitation, and NEPA planning. He has a Bachelor of Science in Hydrology from the University of Nevada-Reno.

Ralph Martinez – GIS Coordinator

Ralph has a Bachelor of Arts degree in Geography, with an emphasis on Cartography, from Kent State University in Ohio and a Master of Science degree in Natural Resources, with an emphasis on Forestry, from The Ohio State University. Ralph has 8 years of experience as a GIS Specialist at a privately-owned photogrammetric engineering firm, and has been the GIS Coordinator for the Almanor Ranger District since 2004.

Bernice McProud - Rangeland Management Specialist

Bernice holds a Bachelor of Science degree in Range Management from Humboldt State University, California. Since 1991 she has worked as a Rangeland Management Specialist on the Tonopah Ranger District of the Humboldt-Toiyabe National Forest, the Needles Field Office of the Bureau of Land Management, and the Almanor Ranger District of the Lassen National Forest where she is currently assigned. Prior to 1991 Bernice worked as a seasonal for the Forest Service in forestry and range technician positions.

Doug Middlebrook - Wildlife Biologist (T.E.A.M.S)

Prior to T.E.A.M.S, Doug was the Zone Wildlife Biologist for the Siuslaw National Forest. He holds a Bachelor of Science degree in Wildlife Biology from Colorado State University and graduate class work at New Mexico State University.

John Natvig - Silviculturist (T.E.A.M.S)

Prior to T.E.A.M.S, John was on the Black Hills National Forest as a Timber Management Assistant. He has a Bachelor of Science Degree in Forestry from Iowa State. He has held a Forest Service positions since 1979 on the Uncompahgre, Routt, and Black Hills National Forests.

Bob Nykamp - Archeologist (T.E.A.M.S)

Bob has been the Forest Archaeologist for three National Forests and a National Grassland, and a shared services archaeologist with the National Park service. Bob has archaeological experience in California, Colorado, Illinois, New Mexico, North Dakota, South Dakota, Utah and Wyoming, working for the Bureau of Land Management, Forest Service, Park Service, and private firms. Bob has been with T.E.A.M.S since May of 2001, providing archaeological and Interdisciplinary Team leader services. He received his Bachelor of Arts in Anthropology from the University of Colorado, Boulder (1979) and attended Graduate School there from 1981-1985.

Craig Odegard - Assistant Forest Botanist

Craig has a Bachelor of Arts degree in Botany from the University of Montana, Missoula and two years of graduate coursework in Plant Ecology from University of Idaho, Moscow. From 1989 to 1996, he worked as a Biological Technician for Glacier National Park and the Bitterroot National Forest in Montana. Since 1996, he has been a Botanist for the Bitterroot and Lassen National Forests.

Lauren Payne - Silviculturist

Lauren holds a Bachelor of Science degree in Natural Resource Management from the California State University, Humboldt. She also completed two semesters of graduate work studying hydrology at California State University, Chico. Lauren completed the Pacific Southwest Region's Natural Resource Institute program and gained certification in Silviculture. She has worked as a Forester in various capacities on the Almanor Ranger District, Lassen National Forest since 1992, and currently serves as the District Silviculturist.

Ken Roby - Fisheries Biologist

Ken Roby currently serves as fisheries biologist on the Almanor Ranger District. Ken has over thirty years of professional experience in fisheries, aquatic ecology and watershed management. Experience has been gained in positions with the Six Rivers, Plumas and Lassen National Forests, the Pacific Southwest Research Station, the East Bay Regional Park District and the University of California, Berkeley. Ken participated in teams that developed the Pacific Southwest Region's Best Management Practices Evaluation Program, the Region's Stream Condition Inventory and the Region's Bioassessment Protocols. He has experience at the Ranger District, Forest and Regional levels and has extensive experience in evaluating effects of land management practices on watershed and aquatic resources, watershed assessment, planning and implementing stream and watershed restoration projects and monitoring of both upslope and channel conditions. Since 1979 he has served as a member of Burned Area Emergency Rehabilitation Teams. For ten years, he taught classes in stream inventory at Feather River College. He received his Bachelor of Science in Conservation of Natural Resources, and Master of Science Degree in Wildland Resource Science, both from the University of California at Berkeley.

Allison Sanger - Forest Botanist

Allison has a Bachelor of Science degree in Environmental and Systematic Biology, with an emphasis in Fisheries and Wildlife Management from California Polytechnic State University, San Luis Obispo, California. She also has two years of Botany graduate coursework from California State University, Chico. Allison has 12 years experience in botany and weed ecology working for the Bureau of Land Management as well as the Modoc and Lassen National Forests in California.

Lucretia Smith - GIS (T.E.A.M.S)

Lucretia came to T.E.A.M.S. from private industry where she worked with Environmental Engineering firms for 5 years. Prior to that she worked for the Forest Service for the three years in the Pacific Northwest. Lucretia specializes in Botany, Range Management, GIS analysis and cartography, and GPS collection. She has taught GIS and GPS at Montana State University. She teaches customized training in GIS (ArcView and ArcInfo), GIS, and AutoCAD. She has a Bachelor of Science in Range Science, Range Management Option with an emphasis in Botany from Montana State University.

Rick Toupin - Forest Resources Enterprises

Rick is currently a Forest Service Region 6 Logging Systems Engineer and subcontracting to T.E.A.M.S.

Christina Veverka - Assistant Forest Botanist

Christina holds a Bachelor of Arts in Biology and Marine Science from the University of San Diego. Christina also holds Master of Science in Biology from Idaho State University. She has worked as an ecologist and botanist for the past 14 years, working for organizations such as the Nature Conservancy, the Natural Resource Conservation District, and the Bureau of Land Management. For the past year, Christina has worked as the Assistant Forest Botanist for the Lassen National Forest.

Mark Williams - Wildlife

Mark holds a Bachelor of Science in Wildlife Management from Humboldt State University. He has held the District Wildlife Officer position on the Almanor Ranger District since 2000. He has 25 years experience with the Forest Service and in addition to wildlife has also held positions in planning, culture, botany, watershed, and fire. In addition to his position on the District, Mark also serves on a Regional assessment team for the willow flycatcher and is the wildlife biologist for the HF-QLG monitoring team.

Judy York - Writer-Editor (T.E.A.M.S)

Judy came to T.E.A.M.S. in March of 2004 from the Idaho Panhandle National Forests where she worked as an interdisciplinary team leader and writer-editor for 10 years. Prior to that, she worked in public affairs as an information assistant for the Idaho Panhandle and Nez Perce National Forests. She has several years of experience working on timber, wildlife, and fire crews, and has supported fire incidents as an information officer and communications center manager. Degrees include a Bachelor of Science in Wildlife Resources and a Master of Science in Natural Resources Communications from the University of Idaho.

Distribution of the Environmental Impact Statement

This environmental impact statement has been distributed to individuals who specifically requested a copy of the document. In addition, copies have been sent to the following Federal agencies, federally recognized tribes, Sate and local governments, and organizations representing a wide range of views regarding forest health recovery projects.

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Index

Air Quality, 10, 11, 40, 86, 101, 105, 112, 116, 296, 297, 304
American Marten, 40, 135, 171, 176, 184, 185, 186, 189, 191, 314, 315, 318, 321, 322
marten, 40, 135, 171, 191, 321, 322
area thinning, 2, 6, 7, 8, 18, 29, 30, 31, 32, 34, 36, 38, 39, 56, 65, 72, 88, 93, 96, 108, 142, 164, 166, 267, 273, 282, 287, 293, 296, 298
Area thinning, 6, 17, 54, 55, 77, 96, 142, 148, 297
area thinnings, 2, 6, 17, 18, 35, 96, 100, 102, 296
Area thinnings, 17, 54, 96
basal area, 5, 6, 14, 17, 23, 36, 37, 38, 45, 46, 49, 50, 54, 55, 95, 97, 108, 115, 125, 131, 142
Basal area, 64, 74, 76
Best Management Practices, 27, 29, 31, 308, 323
Black bear, 41, 192, 299
BMPs, 10, 27, 29, 31, 214, 223, 234, 241, 242, 302
California red-legged frog, 230, 231
California spotted owl, 6, 9, 23, 32, 40, 120, 121, 134, 136, 137, 140, 148, 153, 155, 157, 158, 161, 166, 167, 297, 300, 313, 314, 316
California Spotted Owl, 40, 121, 134, 135, 191, 322, 324, 325
California Wildlife Habitat Relationships, 17, 45, 123, 315
canopy, 5, 6, 14, 15, 16, 17, 18, 19, 23, 24, 25, 29, 30, 31, 32, 35, 36, 37, 38, 43, 45, 46, 47, 49, 50, 54, 55, 65, 66, 67, 72, 74, 82, 88, 94, 95, 96, 97, 100, 101, 102, 108, 110, 113, 114, 115, 116, 125, 127, 129, 137, 142, 154, 157, 162, 164, 167, 172, 173, 174, 175, 178, 179, 182, 191, 205, 206, 207, 208, 209, 264, 267, 269, 293, 294, 296, 297, 298, 299, 300
Canopy, 14, 17, 18, 19, 36, 50, 55, 72, 76, 77, 83, 94, 97, 100, 106, 109, 114, 128, 172, 173, 174, 185
Cascades frog, 42
CWE, 237, 238, 241, 301
CWHR, 10, 15, 17, 19, 23, 24, 25, 29, 30, 36, 37, 40, 43, 45, 46, 47, 49, 50, 51, 52, 54, 55, 56, 57, 59, 66, 68, 70, 71, 72, 74, 75, 77, 78, 79, 80, 81, 82, 83, 87, 88, 92, 93, 95, 96, 97, 100, 102, 104, 105, 106, 114, 115, 116, 122, 123, 125, 129, 141, 142, 162, 164, 165, 166, 171, 174, 175, 176, 178, 180, 182, 183, 184, 188, 189, 193, 194, 199, 201, 202, 205, 206, 207, 208, 210, 297
Defensible Fuel Profile Zones, 14, 23
DFPZ, 3, 5, 8, 14, 15, 16, 17, 20, 23, 24, 29, 30, 31, 32, 34, 35, 36, 37, 38, 49, 50, 51, 52, 55, 56, 57, 60, 65, 67, 69, 70, 71, 72, 76, 77, 78, 81, 83, 85, 88, 92, 96, 102, 106, 107, 108, 110, 112, 114, 116, 117, 118, 119, 125, 126, 132, 143, 147, 153, 159, 160, 164, 165, 167, 168, 178, 179, 180, 183, 185, 188, 189, 190, 194, 200, 203, 254, 262, 271, 272, 273, 279, 283, 286, 287, 291, 293, 296, 298, 299, 300, 324
DFPZs, 2, 3, 6, 7, 8, 35, 38, 39, 96, 100, 102, 105, 112, 142, 157, 180, 192, 194, 261, 267, 286, 293, 294, 296, 297
group selection, 2, 6, 7, 8, 19, 20, 29, 30, 34, 36, 37, 38, 39, 56, 57, 59, 65, 67, 72, 80, 85, 94, 108, 109, 261, 273, 283, 296, 297
Group selection, 7, 20, 24, 31, 55, 56, 57, 59, 65, 69, 72, 79, 80, 85, 100, 102, 103, 105, 109, 110, 126, 128, 142, 178, 195, 267, 296, 299, 300
group selections, 2, 7, 57, 69, 108, 142, 143, 145, 164, 165, 180, 182, 190, 194, 195, 206, 208, 209, 293, 298, 299, 300
Group selections, 7, 20, 56, 57, 69, 79, 126, 128, 142, 178, 195, 296, 299, 300
Hairy woodpecker, 41, 201, 299
Limited operating periods, 41
LOP, 32, 121, 208
LOPs, 32, 121, 142, 289, 297
meesia moss, 33, 249
Meesia moss, 248
Mingan moonwort, 33, 247, 249
mountain yellow-legged frog, 42
Mule deer, 41, 192, 299
Northern goshawk, 32, 166, 168, 298
Northern Goshawk, 40, 121, 135, 162, 191, 320
Noxious weeds, 263

Noxious Weeds, 34
Pacific Crest Trail, 36, 286, 288, 293, 294, 310, 311
Pacific Fisher, 40, 135, 171, 191
PACs, 6, 7, 27, 37, 121, 137, 138, 141, 150, 156, 162, 165, 168, 179, 297
Pallid bat, 189, 299
Pallid Bat, 40, 135, 189, 191, 313
Peregrine Falcon, 41, 192, 208
Pileated Woodpecker, 41, 192, 204, 314, 321
protected activity centers, 6, 7, 121, 135, 162, 205
rainbow trout, 301
Rainbow trout, 232
Recreation Opportunity Spectrum, 36, 288, 290, 322
Reforestation, 20, 39, 57, 58
RHCA, 29, 30, 31, 33, 64, 99, 179, 186, 235, 236, 237, 240, 241, 242, 245, 254, 255, 261, 262, 266, 267, 268, 269, 270, 302
RHCAs, 5, 7, 29, 30, 31, 32, 33, 36, 255, 261, 262, 267, 293, 301, 302
Riparian Habitat Conservation Areas, 5, 29
Sierra Nevada Red Fox, 40, 135, 191
Special Interest Plants, 33
stand density index, 5
Visual Quality Objectives, 291, 292, 293
western goblin, 33, 247, 249
Willow flycatcher, 169, 298
Willow Flycatcher, 40, 135, 169, 191, 323

Appendix A – Cumulative Effects

Past, Present and Reasonably Foreseeable Future Actions - List of Cumulative Actions

This section summarizes the analysis area and the temporal scale (time) considered for the cumulative effects analysis. Each resource analysis has disclosed the specific cumulative effects for that particular resource area. Refer to the applicable FEIS sections for a specific discussion of cumulative effects.

Scope of the Cumulative Effects Area (CEA)

The cumulative effects area would be at a minimum the project area. In addition, some resources would use a larger CEA such as subwatersheds. The time period used for including past actions is 20 years before present (1985-2005), and 30 years for cumulative watershed effects analysis.

Past, Present and Reasonably Foreseeable Future Actions

The following list of cumulative effects actions is considered for this project. Maps showing these activities in relationship to the CRMP follow the tables. Tables A-1 through A-5 summarize those past, ongoing and foreseeable future actions, with a description of the activity and the acres affected. Guidance on cumulative effects, in particular, past actions, was considered, based on Connaughton (2005), here by incorporated by reference. In addition, those areas considered for cumulative effects are shown in Figures A1 through A12.

Table A-1. List of Past Vegetative Management Actions - (see Figure A-1)

Activity Name	Year	Activity Description
Panhandle TS	1975	Timber harvest on 1,093 acres using the following silviculture prescription: Overstory Removal on 1,093 acres.
Sheephole TS	1977	Timber harvest on 1,421 acres using the following silviculture prescription: Overstory Removal on 1,421 acres.
Eagle TS	1981	Timber harvest on 700 acres using the following silviculture prescription: Intermediate Sanitation on 700 acres.
Grizzly Creek TS	1983	Timber harvest on 585 acres using the following silviculture prescription: Overstory Removal on 585 acres.
Grizzly 97% Resale	1983	Timber harvest on 597 acres using the following silviculture prescription: Intermediate Thinning (thin from above) on 597 acres.
Miller Creek TS	1983-1984	Timber harvest on 180 acres using the following silviculture prescriptions: Intermediate Sanitation on 50 acres; Overstory Removal on 28 acres; Regeneration Clearcut on 92 acres; and Seed Step Shelterwood on 10 acres.
Happy Days TS	1985	Timber harvest on 669 acres using the following silviculture prescriptions: Intermediate Sanitation on 535 acres; Overstory Removal on 23 acres; and Regeneration Clearcut on 111 acres.
Basin TS	1986-1987	Timber harvest on 589 acres using the following silviculture prescriptions: Intermediate Sanitation on 71 acres; Intermediate Thinning (thin from above) on 15 acres; and Seed Step Shelterwood on 503 acres.

Activity Name	Year	Activity Description
Kay TS	1986-1987	Timber harvest on 570 acres using the following silviculture prescriptions: Overstory Removal on 570 acres.
Lemm Ranch TS	1987	Timber harvest on 534 acres using the following silviculture prescriptions: Intermediate Sanitation on 456 acres; Overstory Removal on 30 acres; and Regeneration Clearcut on 48 acres.
Fanani TS	1987-1988	Timber harvest on 497 acres using the following silviculture prescriptions: Intermediate Sanitation on 63 acres; Overstory Removal on 100 acres; Regeneration Clearcut on 142 acres; and Seed Step Shelterwood on 192 acres.
Robbersroost TS	1987-1989	Timber harvest on 683 acres using the following silviculture prescriptions: Overstory Removal on 546 acres; and Regeneration Clearcut on 137 acres.
Hollow Middle TS	1993	Timber harvest on 484 acres using the following silviculture prescriptions: Overstory Removal on 484 acres.
Ruffa TS	1985	Timber harvest on 1,087 acres using the following silviculture prescriptions: Intermediate Sanitation on 1,029 acres; and Overstory Removal on 58 acres.
Ruffa TS	1998	Timber harvest on 728 acres using the following silviculture prescriptions: Intermediate Sanitation on 78 acres; Multiproduct Thinning (thin from below) on 297 acres; and Prep Step Shelterwood on 353 acres.
Shanghai Fannani TS	1993-1998	Timber harvest on 1,186 acres using the following silviculture prescriptions: Intermediate Sanitation on 278 acres; Multiproduct Thinning (thin below) on 848 acres; and Prep Step Shelterwood on 68 acres.
Mudhole TS	1997-1999	Timber harvest on 1,217 acres using the following silviculture prescriptions: Intermediate Sanitation on 109 acres; and Multiproduct Thinning (thin from below) on 1,108 acres.
Little Grizzly TS	1989-1990	Timber harvest on 532 acres using the following silviculture prescriptions; Overstory Removal on 60 acres; Regeneration Clearcut on 25 acres; and Seed Step Shelterwood on 447 acres.
Castle TS	1989-1992	Timber harvest on 989 acres using the following silviculture prescriptions: Intermediate Sanitation on 202 acres; Overstory Removal on 278 acres; Regeneration Clear Cut on 308 acres; and Seed Step Shelterwood on 201 acres.
Lost Tom TS	1991-1992	Timber harvest on 353 acres using the following silviculture prescriptions: Intermediate Sanitation on 81 acres; Overstory Removal on 258 acres; and Regeneration Clearcut on 14 acres.
Mudhole2 TS	2000	Timber harvest on 116 acres using the following silviculture prescription: Multiproduct Thinning (thin from below) on 116 acres.
Burned Out TS	2003	Timber harvest on 1,183 acres, Post Fire Restoration and Regeneration
Juliet TS	2003	Timber harvest on 23 acres Post Fire Restoration and Regeneration
Lost Lake TS	1999-2004	Timber harvest on 1,056 acres using the following silviculture prescriptions: Intermediate Sanitation on 279 acres; and Multiproduct Thinning (thin from below) on 777 acres.

Activity Name	Year	Activity Description
Storrie Wildfire Event Storrie Post-Fire Project (see Figure A-2)	2000	Total Acres Burned: 56,060; NFS Acres: 52,035; Private: 4,026. The Storrie Post-Fire Restoration Project EA (2002) states that approximately 27,000 acres were on the Lassen NF (Almanor RD), of which approximately 21,000 acres were in HFQLG Off-Base area. Approx 1,200 acres of NF have been harvested to date (2003) and remain under contract for harvesting through 2005 (picking up additional mortality if it occurs). Adjacent Private landowners logged all of their fire affected lands (approximately 5,300 acres (within three sub-watersheds in/adjacent to Creeks Project) in the fall of 2000 and early summer of 2001, and planted in 2002.
Adams Windthrow Fuels Reduction	2004	760 acres tractor removal of windthrown timber
Eagle Windthrow Fuels Reduction	2004	300 acres tractor removal of windthrown timber
Private Land Use	Pre 2000	10% Thin every 10 years.
Private Land Use	2000-2001	1,192 acres of fire salvage and reforestation.

Source: Almanor Ranger District Records

Summary of Table A-1. Acres of Past Vegetative Management Actions by Treatment Type

Treatment Type	Acres Treated
Prep Step Shelterwood	421
Intermediate Thinning (thin from above)	612
Regeneration Clearcut	877
Windthrown Fuels Reduction	1060
Post Fire Restoration and Regeneration	1206
Seed Step Shelterwood	1353
Multiproduct Thinning (thin from below)	3146
Intermediate Sanitation	3931
Overstory Removal	5534

Table A-2.List of Ongoing Actions (see Figure A-3)

Activity Name	Year	Activity Description
Lost Lake Timber Sale	1999-ongoing	Timber harvest consisting of commercial thinning (thin from below) on 206 acres.
Jonesville DFPZ	2004-ongoing	Approximately 880 acres of DFPZ (thin from below) treatment A approx 262 acres, Treatment B approx 576 acres, Treatment C approx 42 acres (Goshawk PAC).
Philbrook DFPZ	2004-ongoing	Approximately 415 acres of DFPZ: Treatment A approx 245 acres and Treatment B approx 170 acres.
Browns Ravine Oak Enhancement DFPZ	2004-ongoing	Approximately 987 acres of treatment, approx 880 acres of commercial thinning (thin from below) and approx 107 acres of hand treatment.
West Shore DFPZ Project	2004-ongoing	Approximately 775 acres of DFPZ construction, treatments A, B and C.
Prattville DFPZ	2001-ongoing	Approximately 1,355 acres of DFPZ construction, treatment B.

Activity Name	Year	Activity Description
Jonesville Forest Recovery	2000-ongoing	Approximately 1,762 acres of DFPZ construction, treatment B.
Trail Maintenance	ongoing	Pacific Crest National Scenic Trail, Soda Creek Trail: This work typically includes, logging out of the trail tread, brushing, constructing, reconstructing, maintaining waterbars or other erosion control devices, installing and maintaining signs. This work would be accomplished by a combination of force account crews, volunteers, and contractors from May 15 through April 15 annually.
Road Maintenance	ongoing	Annual road maintenance, grading of roads and ditches, culvert cleanout, hazard tree removal.
Plantation Maintenance	ongoing	Almanor Ranger District; Creeks Planning File
Special Uses	ongoing	Annually waterlines are replaced as needed, weather stations are maintained for access and fire protection, hazard trees and sub-merchantable material removed, and fire clearance is maintained.
Mining operations	ongoing	No Plans of Operation or Notices of Intent to Operate have been filed.
Grazing Allotments and Range Permits[1]	ongoing	Butt Creek, Soda Creek, Soldier Meadows, West Humbug and North Butte Allotments. Active permit in use for Soda Creek/North Butte only with 158 cattle AUMs from June 1-Sept. 30 annually.
Post Poles; Christmas Tree; Fuel Wood Use	ongoing	Use is common in project area.
Private Land use	2005-ongoing	Several large parcels of private land within the project boundary. 188 acres of clearcut, 1,440 acres of overstory removal, 93 acres of sanitation.
Timber harvest on private lands	ongoing	Estimated at 10% of lands harvested, using an intermediate cut, per decade on privately held commercial timber lands. Harvests resemble Area Thinning with an upper diameter limit, followed by a wide range of associated fuels treatments.
Recreation Maintenance	ongoing	Hazard tree removal, fire rings removed, signs installed, and sites closed to use within 100' of water sources.
OHV, Bikes, Hikes, Fishing, Dispersed Camping, Camping Use, Trail Rides, Snowmobile use.	ongoing	Recreation use by the public is common.

Source: Almanor Ranger District Records

Summary of Table A-2. Acres of Ongoing Vegetative Management Actions by Treatment Type

Treatment Type	Acres Treated
Commercial Thinning (thin from below)	206
DFPZ	5187

Table A-3. Detailed List of Ongoing Range Allotments (see Figure A-4)

Allotment Name	Livestock Class	Livestock Kind	Livestock Number	Season of Use	AUMs	Status
Butt Creek	Cattle	Cow/Calf	70	6/1-9/30	210	Vacant
Soldier Meadows	Cattle	Cow/Calf	20 on 200 off 220 total	6/1-9/30	106	Vacant
Soda Creek/North Butte	Cattle	Cow/Calf	20 on 20 off 40 total	6/16-9/15	158	Active
West Humbug	Cattle	Cow/Calf	30 on 670 off 700 total	6/1-9/30	120	Active/Non-use

Source: Almanor Ranger District 2230 Permit Files

Table A-4. List of Reasonably Foreseeable Future Actions - (2005-+) (see Figure A-5)

Activity Name	Year	Activity Description
Special Uses: Jonesville OHV Warming Hut	2005	Construction of a warming hut along the Jonesville Snowmobile Route. Submission of a grant for the construction of a mid point hut/restroom facility along the Yellow Creek road system. Currently the grant is schedule to be submitted in October 2004 by the Butte Meadows Hillsliders Snowmobile Club.
Fox Farm DFPZ Project	2005	Approximately 760 acres of DFPZ Construction, Treatments A, B and C
Willow Forest Health Recover Project	2006 (est.)	Implementation of HFQLG: approximately 6600 acres of DFPZ, approximately 1500 acres of GS, and approximately 5000 acres of Area Thinning. This project is still in the design phase, acres are an estimate only.
Creeks DFPZ Maintenance (see Figure A-5)	2010-2040	Expected DFPZ maintenance treatments are tiered to the Herger-Feinstein Quincy Library Group Final Supplemental Environmental Impact Statement (HFQLG FSEIS, 2003) (USDA FS, 2003d. The proposed DFPZ treatment units were analyzed using GIS to identify predicted post-treatment vegetation conditions and maintenance regimes identified under the SEIS. Approximately 72 acres of DFPZ maintenance using herbicides was identified thru analysis using the 2003 HFQLG FSEIS. Upon review, the strata of 52 of these acres were deemed incorrect based on local vegetation data. It was not considered cost efficient or reasonable to treat the remaining 20 acres using herbicides because they were small, discontinuous areas. These areas were joined to adjacent larger areas of proposed hand and prescribed fire treatments. Additionally, 37 acres of DFPZ maintenance using hand treatments within 3 years was identified according to the 2003 HFQLG FSEIS. These 37 acres of proposed hand treatment were highly fragmented across the project area, with most averaging less

Activity Name	Year	Activity Description

than one acre. Vegetation, particularly brush, is not expected to accumulate to levels requiring maintenance in these areas any earlier than within 5 years of initial treatment. This is based on observations of hand treatments and vegetation growth within existing local plantations. Delaying hand treatment within these small discontinuous areas until 5 years would not measurably decrease overall DFPZ effectiveness.

With the above described modifications, approximately 430 acres of maintenance are identified for initial treatment at 5 years, 5,240 acres for initial treatment at 10 years, and 230 acres for initial treatment at 30 years. The expected interval for subsequent maintenance treatments are listed in Table A-5. Secondary maintenance treatments would be conducted similarly to initial maintenance treatments. Post treatment evaluation and monitoring would be conducted to further confirm and/or adjust proposed maintenance treatments based on local existing and projected fuel conditions.

Potential maintenance treatments are summarized and described below:

Table A-5. Potential Maintenance Treatments

Maintenance Treatment	Time of Initial Maintenance	Time of Secondary Maintenance	Acres
Hand Treatment	5 Year	10 Year	41
Hand Treatment	10 Year	10 Year	222
Mechanical Treatment	5 Year	5 Year (3 times)	370
Mechanical Treatment	10 Year	10 Year	779
Mechanical Treatment	30 Year	30 Year	223
Prescribe Burn	5 Year	10 Year	21
Prescribe Burn	10 Year	10 Year	4,241
Prescribe Burn	30 Year	30 Year	5
No Treatment	--		3
	Total		5,905

Hand Treatment: Hand treatments would entail the use of hand tools such as hoes, or mechanized brush cutters to cut brush and young trees. Small brush may be grubbed out, removing their root systems. Sprouting brush species and hardwoods are expected to re-sprout after hand cutting, but their growth rates would be reduced due to overstory shading and competition. This material would then be hand piled and burned according to a prescribed burn plan. Hand treatment would be performed in sensitive areas such as the inner zone of RHCAs. Hand treatments could damage seedlings and small trees by accidental cutting or scraping away cambium. Hand treatments could cause minor soil disturbance but should not create any off-site soil movement. The burning of hand piles could pose a risk of scorching to smaller residual trees. Potential damage to the stand from the hand treatments and pile burning are expected to be very minor and most likely immeasurable.

Mechanical Treatment: Mechanical treatments would vary depending on the type of establishing vegetation and ground conditions such as amount of surface rock. Most likely, mastication or tractor crushing would be used to treat small trees and woody shrubs. Stands containing predominantly herbaceous or young, non-sprouting vegetation may be treated by discing. Discing would only be used where soil and watershed Best Management Practices (BMPs) could be applied, so that the effects of

Activity Name	Year	Activity Description
		soil disturbance would be minimized. Concentrations of dead fuels may be machine piled and burned according to a prescribed burn plan. Dozer-type equipment may cause minor soil compaction or soil disturbance, particularly where track equipment makes turns. Equipment would only operate when soils are dry such that the risk of compaction is minimized. Discing could cause damage to tree roots. Extensive discing on the adjacent Eagle Lake Ranger District indicates root damage from discing is generally minimal and produces little to no observable affects. Residual trees could be damaged by equipment accidentally rubbing up against them, or by accidentally crushing or running over smaller "leave' trees. Damage to the overstory is expected to be rare because of the relatively wide tree spacing. Areas of desirable regeneration would be avoided by equipment to provide protection. **Prescribe Burn:** Prescribed underburning would be used to remove small trees as well as brush and accumulated surface fuels such as needle caste. Underburning would reduce duff layer thickness but not remove it entirely. Occasional "torching" could occur causing small group (4 - 8 trees) or individual tree mortality in trees upwards of 24 inches dbh. At the extreme, prescribed burning could kill up to 10% of stand basal area, predominantly in smaller trees less than 12 inches dbh. Stand growth between prescribed burning treatments would exceed burn mortality, such that stand density and average dbh would continue to increase over time. Burning would be conducted according to a prescribed fire plan developed for the maintenance project. Fire prescriptions would be developed to meet resource objectives including retention levels of desirable small and midstory trees. Prescribed burning would not be expected to measurably alter stand overstory structure or canopy closure, but would remove most understory vegetation including most seedlings and young trees less than 4 inches dbh.

Source: Almanor Ranger District Planning Files

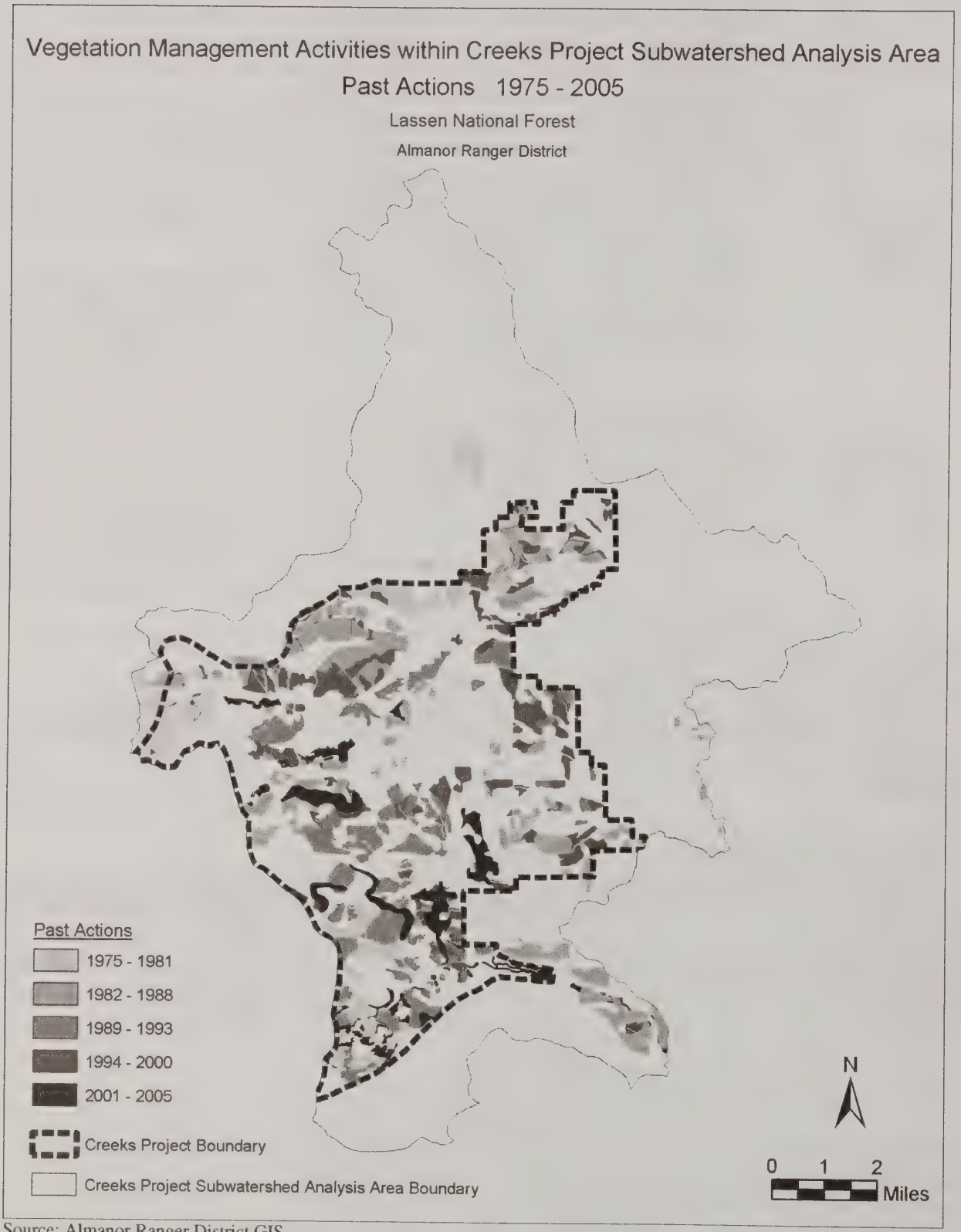
Summary of Table A-4. Acres of Reasonably Foreseeable Future Actions by Treatment Type

Treatment Type	Acres Treated
Group Selection	1500
Area Thinning	5000
DFPZ	7360

Summary of Table A-5. Acres of Potential Maintenance Treatments

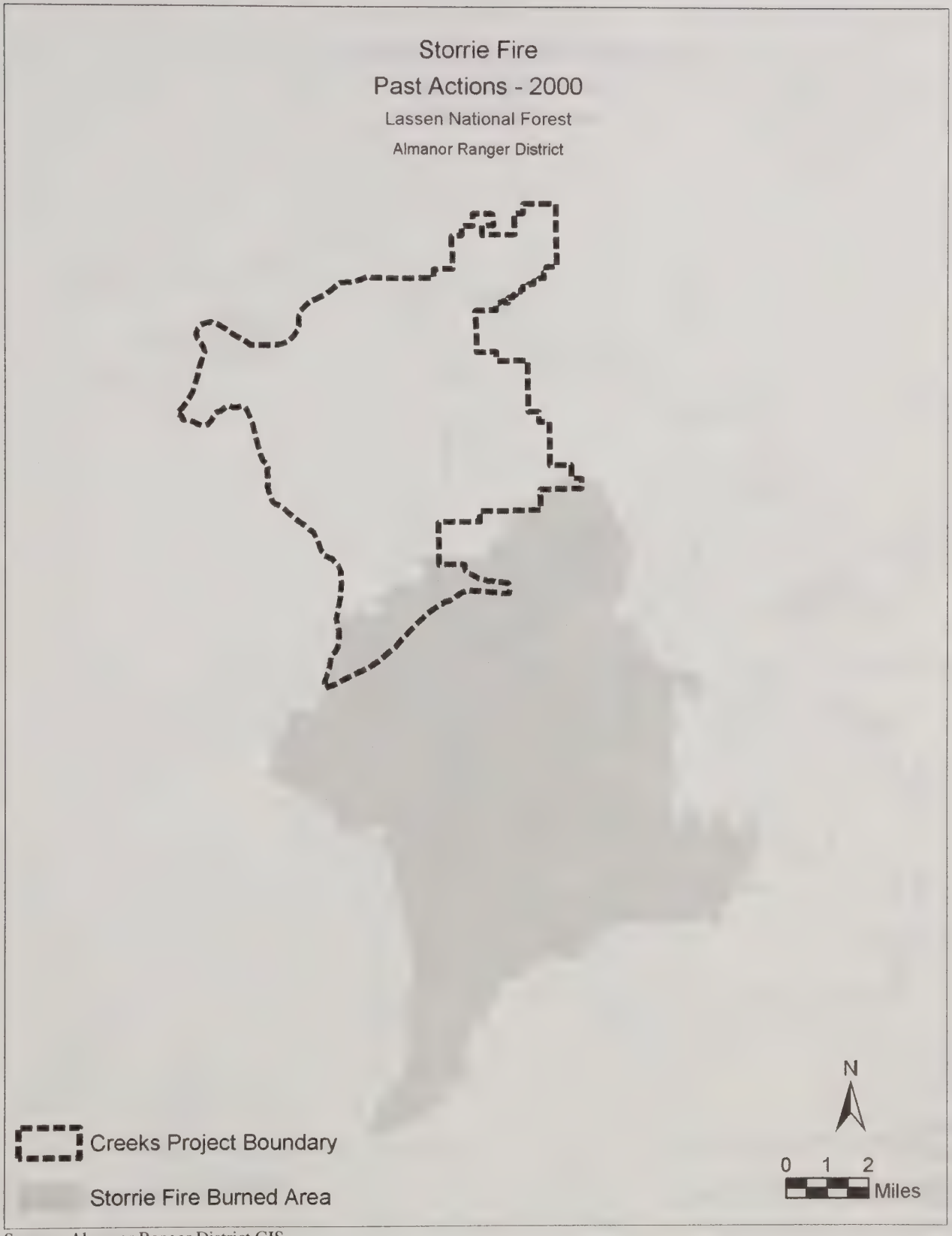
Treatment Type	Acres Treated
Hand Treatment	263
Mechanical Treatment	1372
Prescribe Burn	4267
No Treatment	3

Figure A-1. Vegetation Management Activities within Creeks Project Subwatershed Analysis Area – Past Actions 1975-2005



Source: Almanor Ranger District GIS

Figure A-2. Storrie Fire, Past Actions 2000



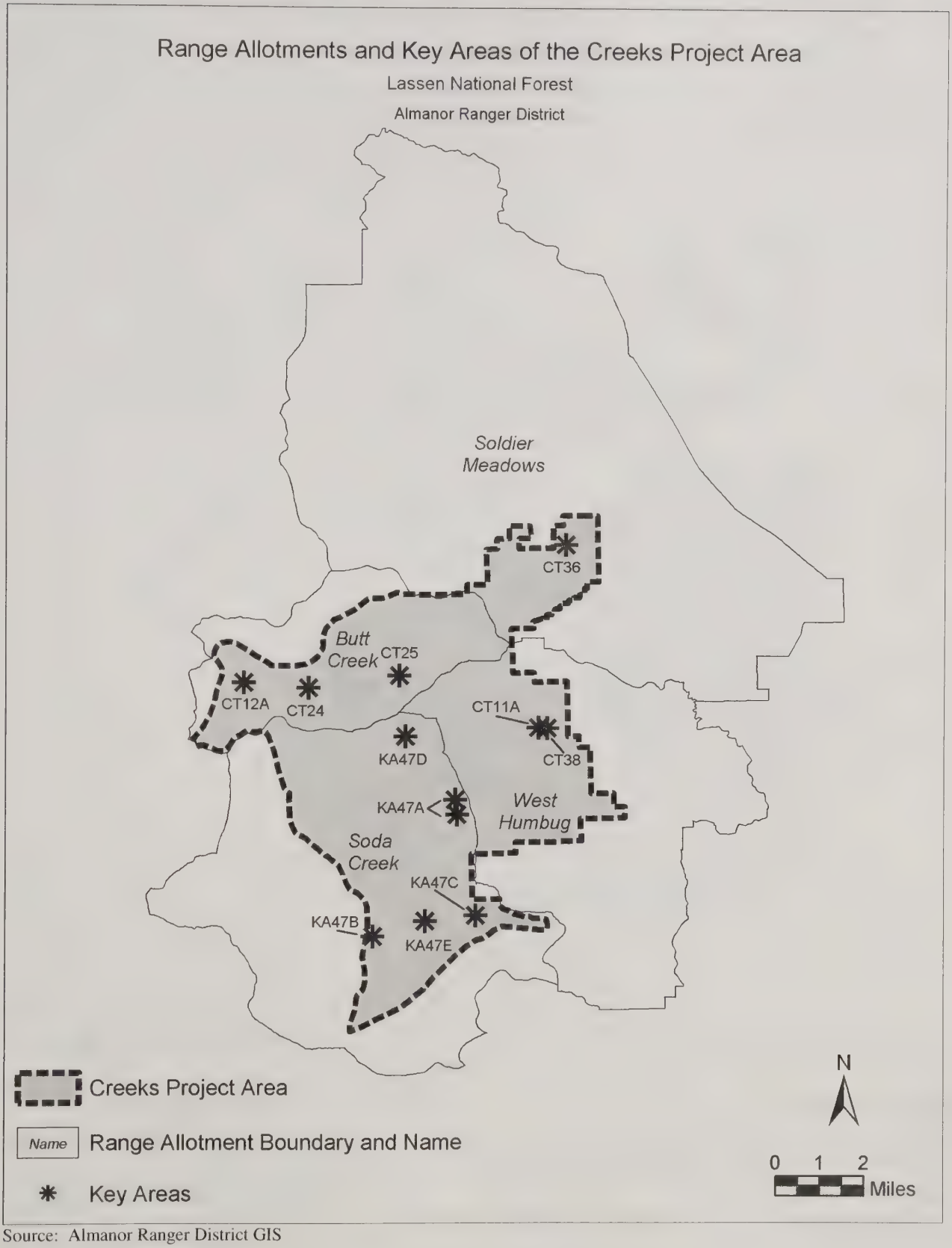
Source: Almanor Ranger District GIS

Figure A-3. Ongoing DFPZ Project Activities



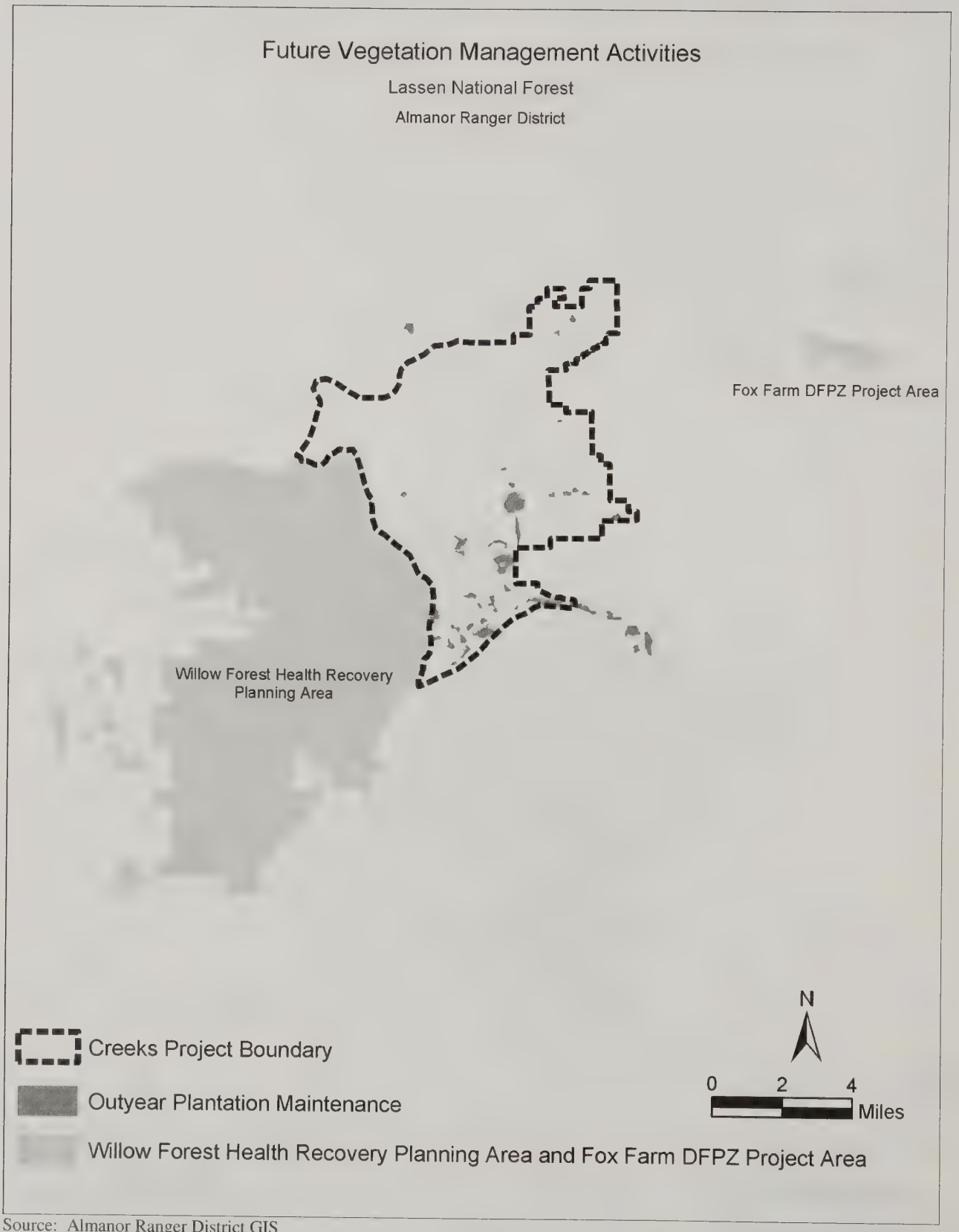
Source: Almanor Ranger District GIS

Figure A-4. Range Allotments and Key Areas of the Creeks Project Area



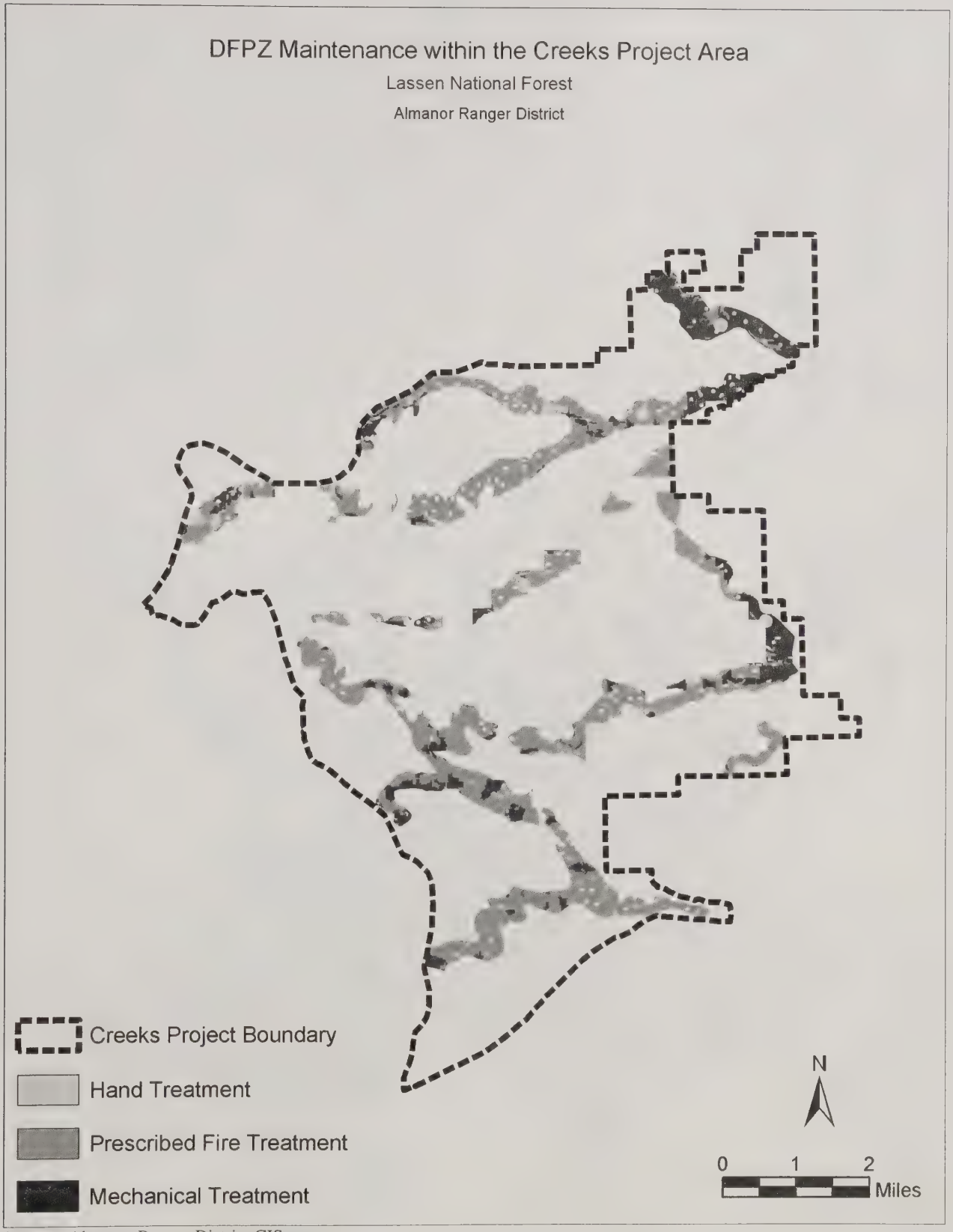
Source: Almanor Ranger District GIS

Figure A-5. Future Vegetation Management Activities



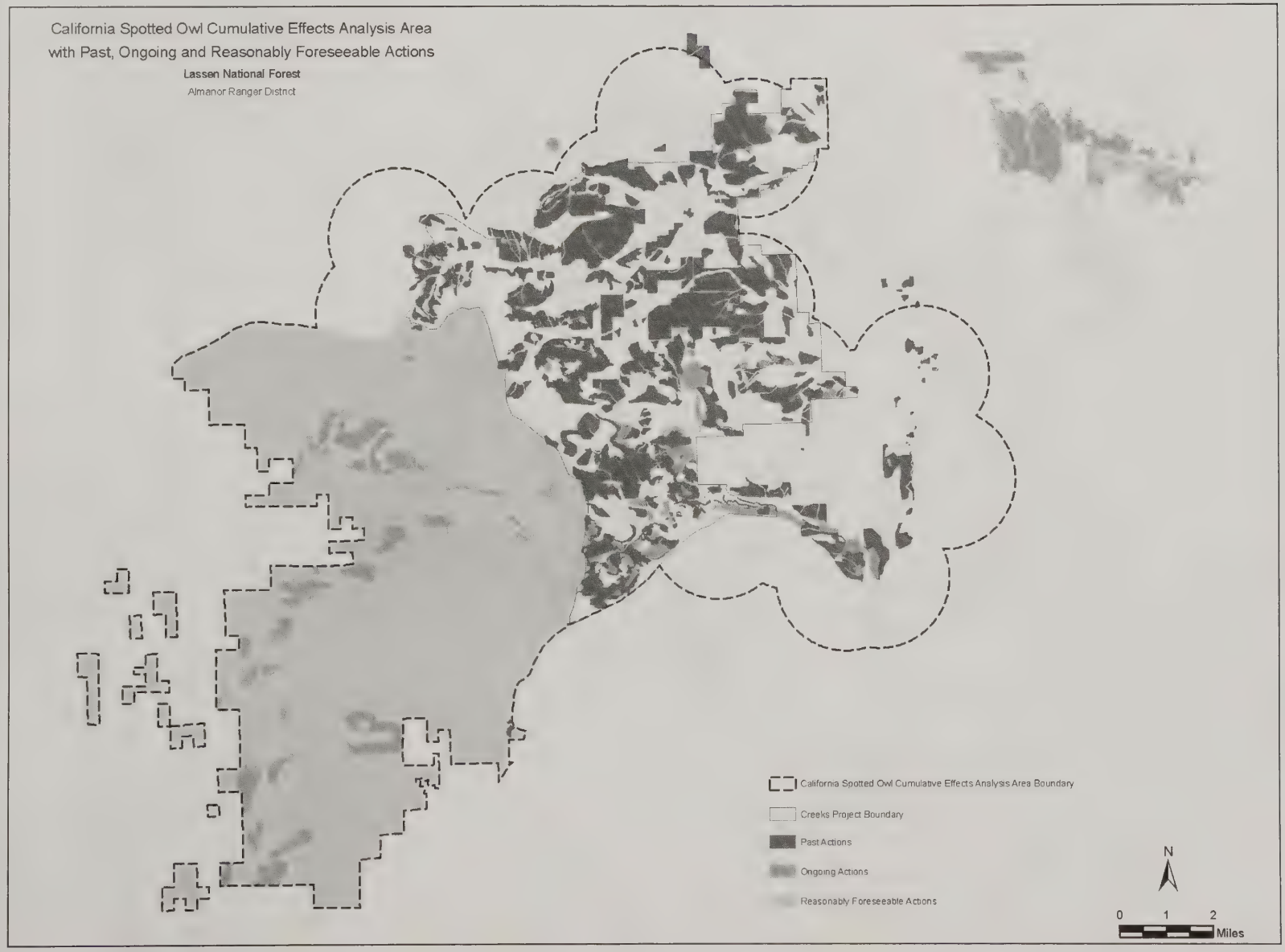
Source: Almanor Ranger District GIS

Figure A-6. DFPZ Maintenance within the Creeks Project Area



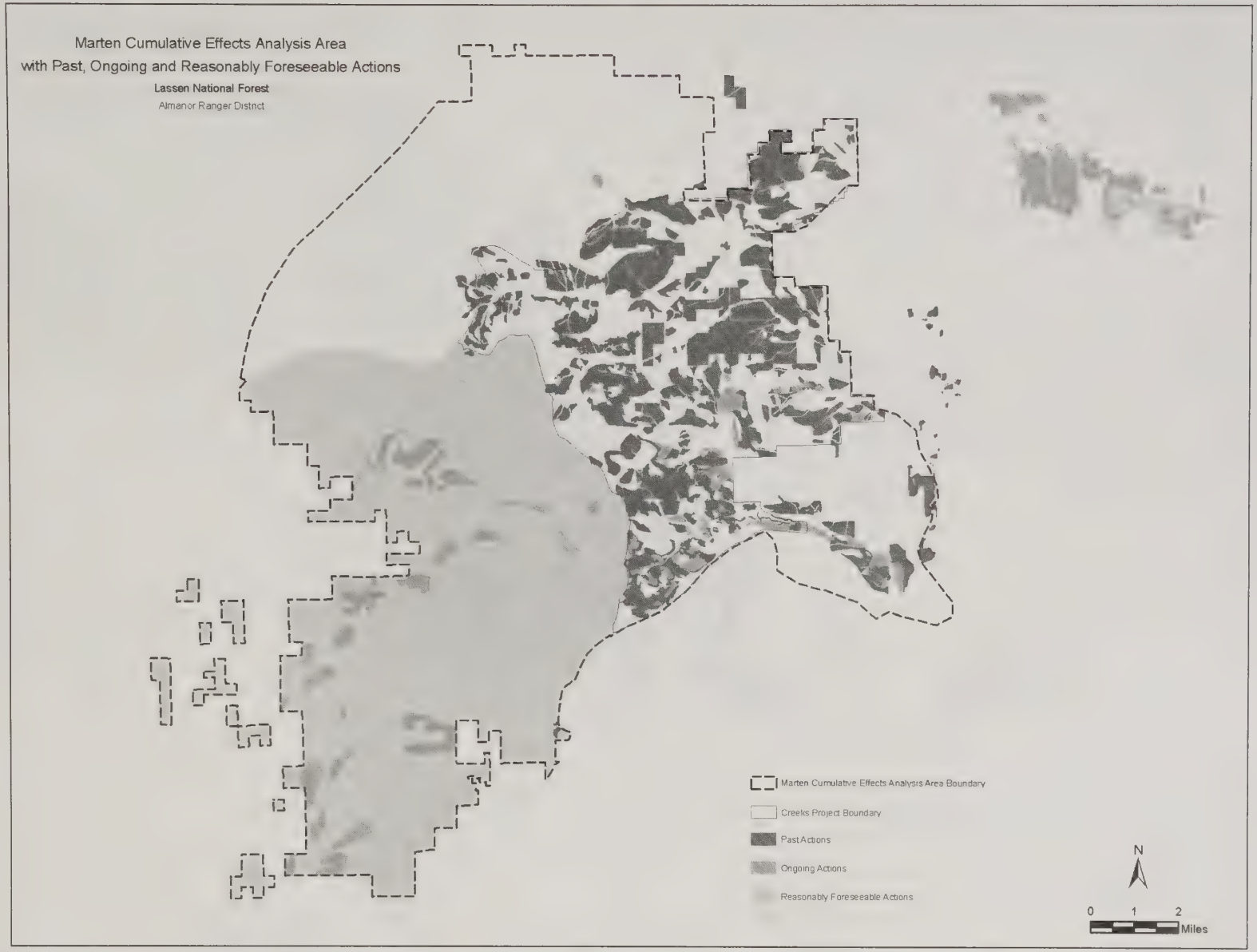
Source: Almanor Ranger District GIS

Figure A-7. California Spotted Owl Cumulative Effects Analysis Area with Past, Ongoing and Reasonably Foreseeable Actions



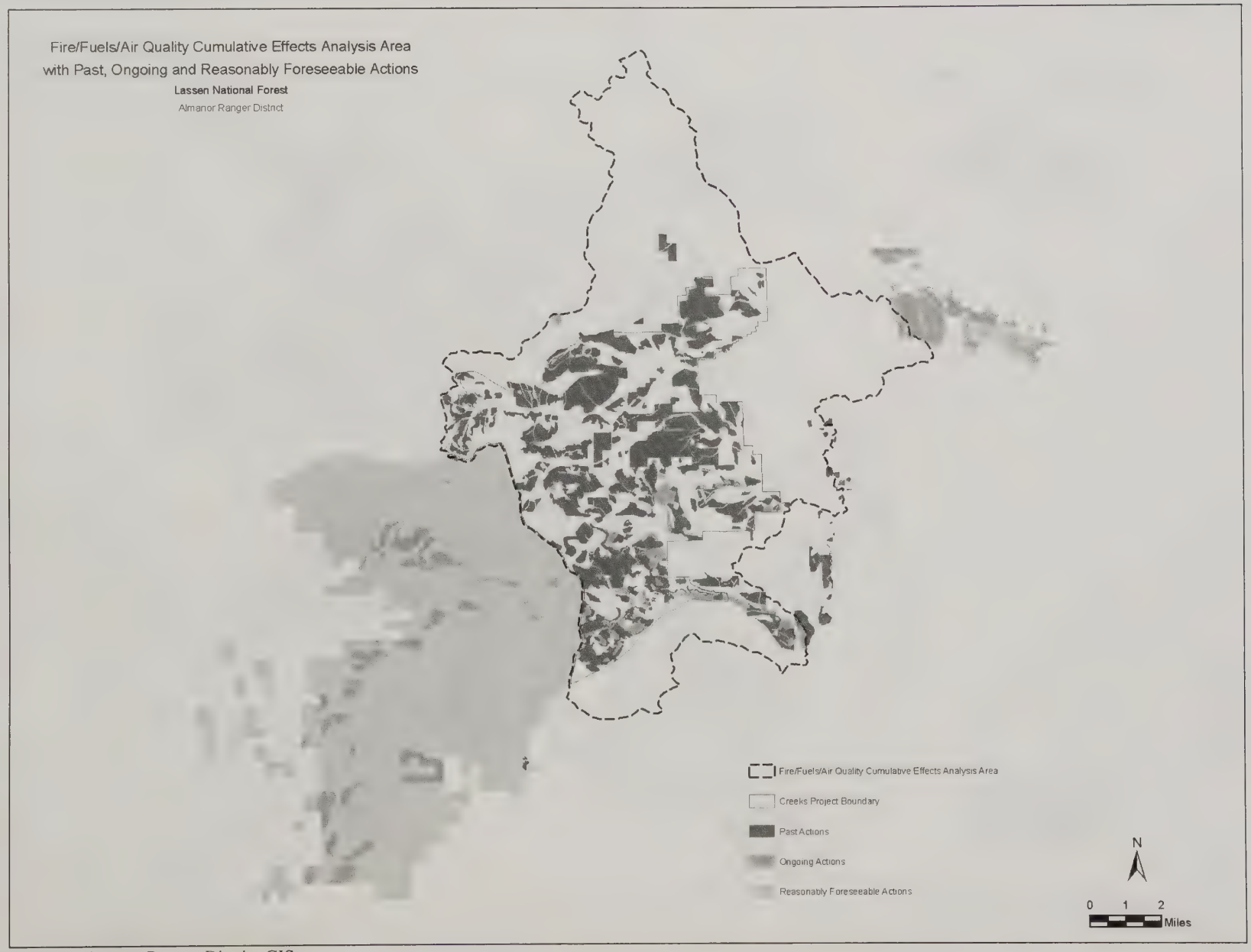
Source: Almanor Ranger District GIS

Figure A-8. Marten Cumulative Effects Analysis Area with Past, Ongoing and Reasonably Foreseeable Actions



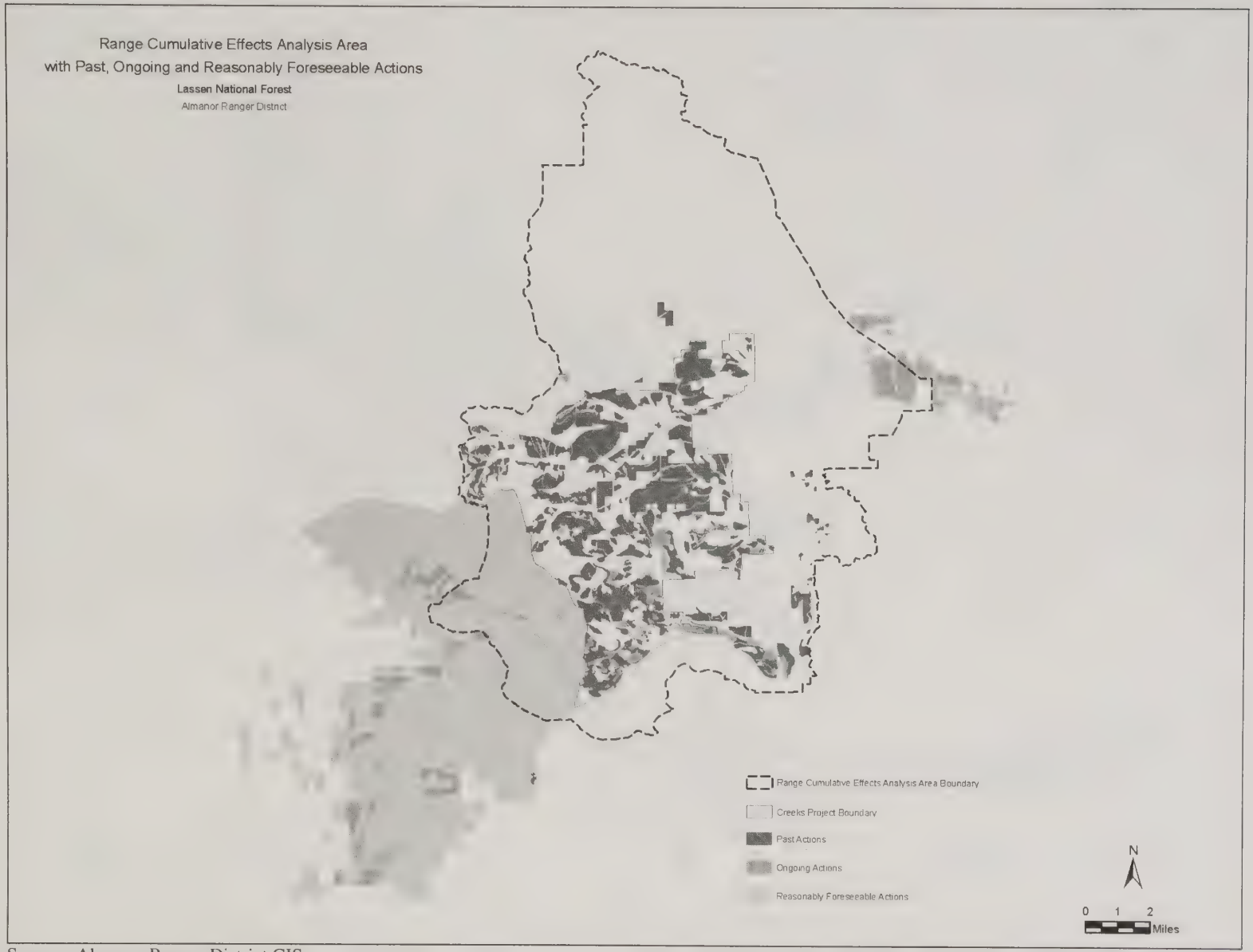
Source: Almanor Ranger District GIS

Figure A-9. Fire/Fuels/Air Quality Cumulative Effects Analysis Area with Past, Ongoing and Reasonably Foreseeable Actions



Source: Almanor Ranger District GIS

Figure A-10. Range Cumulative Effects Analysis Area with Past, Ongoing and Reasonably Foreseeable Actions



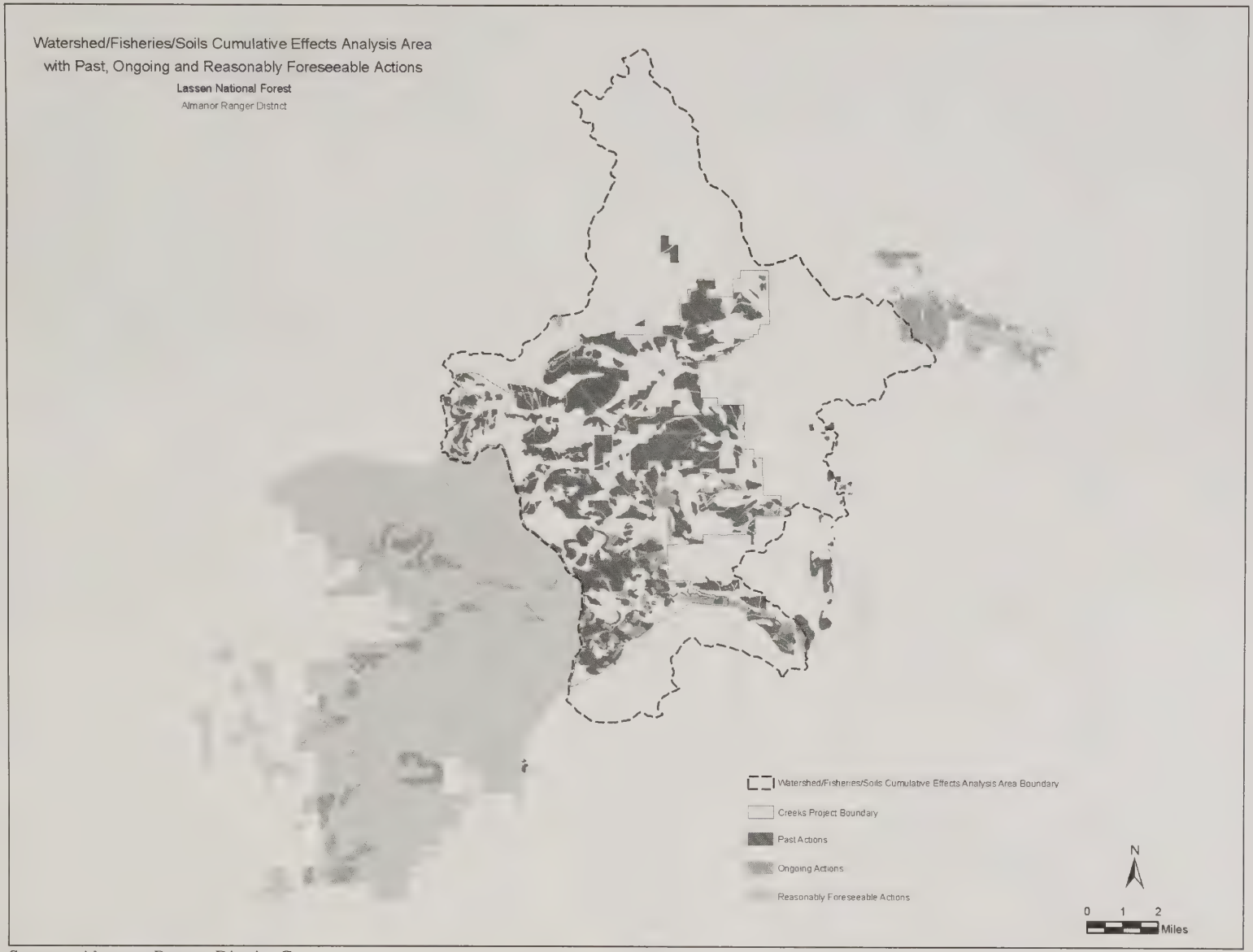
Source: Almanor Ranger District GIS

Figure A-11. Recreation/ Visual Resources Cumulative Effects Analysis Area with Past, Ongoing and Reasonably Foreseeable Actions



Source: Almanor Ranger District GIS

Figure A-12. Watershed/ Fisheries/ Soils Cumulative Effects Analysis Area with Past, Ongoing and Reasonably Foreseeable Actions



Source: Almanor Ranger District G

Appendix B

Creeks Forest Health Recovery Project, Noxious Weed Risk Assessment

Almanor Ranger District, Lassen National Forest, March 29, 2005

Prepared by Christina Veverka, Assistant Forest Botanist

Reviewed by: Allison L. Sanger, Forest Botanist

Introduction

A general Noxious Weed Risk Assessment (NWRA) has been done for the three-Forest Herger-Feinstein Quincy Library Group (HFQLG) pilot project area. The Creeks Forest Health Recovery Project (Creeks) NWRA for the Proposed Action has been developed from the General Outline of a Risk Assessment contained in the 1999 Final Environmental Impact Statement (FEIS), Appendix G, Table G-1, and is tiered from the general NWRA, Appendix G (1999). The General NWRA contains background information, which applies to the Creeks NWRA and should be reviewed as it pertains to this risk assessment. The General Outline of a Risk Assessment provided in the 1999 HFQLG FEIS, I s a guide for evaluating risks and explains the components, variations and risks (high, moderate, and low), which make up this risk assessment. NWRAs can often be subjective and reviewing the Outline of a Risk Assessment (1999 HFQLG FEIS Appendix G, table G-1) is helpful as it pertains to this document.

Non-Proposed Action Dependent Factors

Inventory: The Creeks Project area consists of approximately 32,570 acres, with approximately 10,435 acres proposed for treatment. Noxious weed surveys were conducted in conjunction with rare plant surveys for this project in August and September of 2004. The area has also been surveyed over the past nine years during the course of other projects (Table B-1).

Table B-1. Pervious surveys conducted in the Creeks Project area (1996-present).

Date	Survey Name
September, 2003	Eagle Windthrow Fuels Reduction
September, 2003	Adams Windthrow Fuels Reduction
July/August, 2003	Almanor Road Improvement
September, 2001	Storrie Fire
July-September, 2001	TU-1
July/August, 2001	The Creeks
August, 2001	Milkhouse Flat
August, 1999	Castle
July, 1999	Little John Release and Plant
July, 1999	Scots John Release and Plant
July, 1999	Robbers Roost Hand Release
July, 1999	Happy Days
July, 1999/August 1996	Willow Timber Sale
July, 1997	Willow Lake LE-Grizzly
August 1996	West Humbug Allotment

Date	Survey Name
August 1996, 1990	Summit Timber Sale
July 1996	Butte House and Road Hazard

In addition to the surveys listed above, an inventory of the road network within the project area was conducted in 2004. During this inventory, approximately 110 miles of road were surveyed for noxious weeds within the project area. Although adequate surveys have been done in the analysis area, a complete inventory of the project area for noxious weeds has not been done. Time and personnel constraints have not allowed surveys of this intensity.

Known Noxious Weeds

The California Department of Food and Agriculture's (CDFA) noxious weed list divides noxious weeds into categories A, B, and C. A-listed weeds are those for which eradication for containment is required at the discretion of the County Agricultural Commissioner. C-listed weeds require eradication or containment only when found in a nursery or at the discretion of the County Agricultural Commissioner.

There are three species of CDFA-listed noxious weeds known to occur within the project area (Table B-2). Canada thistle (Cirsium arvense), bull thistle (cirsium vulgare), and yellow starthistle (Centaurea solstitalis) are all C-listed weed species and are therefore low priority weeds for management on the Forest. The majority of these weed occurrences consist of scattered infestations of Canada thistle along Butt Creek and along the east and west forks of Yellow Creek. Due to the size and location of these Canada thistle infestations, the majority of them have not been treated. One small, new occurrence of yellow starthistle was found and treatment along the Humbug road (27N11). A new occurrence of bull thistle within the Lassen National Forest, but because bull thistle is a temporary weed that comes in after fire or timber harvesting it is generally not treated on the Forest.

Habitat Vulnerability

The Creeks Project is located within relatively high elevation, Westside vegetation types, which include dense, mixed conifer stands with scattered fir, and lodgepole stands. Due to the high canopy cover and precipitation associated with these vegetation types, habitats within the project area are not as susceptible to weed invasion as those habitats found within the dryer or lower elevation areas of the forest. However, disturbance from roads and logging activity can increase the risk of weed invasion within the project area. A moderate amount of past and current disturbance can be found within the analysis area, and several plantations are present as well. Even with this disturbance, the upland areas within the project that have been surveyed have been found to be relatively weed free. The most vulnerable habitats within the Creeks project are the riparian areas that are prone to infestations of Canada thistle. However, these areas would not be disturbed during project implementation, so there is little risk of project activities exacerbating the Canada thistle problem. Thus, even with past and continuing impacts within the analysis area, the Creeks Project is relatively free of the many weed species and problems faced in other areas for the forest, giving it a low risk for habitat vulnerability.

Table B-2. Noxious weed occurrences and treatments within the Creeks Project area.

Occ. #	Species	Location	Size (acres)	Year Found	Treatment
2	Bull thistle	Miller Ravine	20	2004	None. Plants along edge of wet meadow.
1	Canada thistle	Robbers Roost near the 27N14 road	.10	1994	Pulled and bagged. Site has been treated yearly since 2000. Plants are along road and in drainage.
10a	Canada thistle	Robbers Roost. Intersection of 27N59 road and Butt Creek	.10	2001	Pulled and bagged. Site has been under treatment since 2001. Plants are around culvert at creek crossing.
10b	Canada thistle	Robbers Roost along Butt Creek	.25	2004	None. Plants are growing in the riparian area along the creek.
12a	Canada thistle	Yellow Creek	2.0	2002	None. Plants are growing in the riparian area along the creek.
12b	Canada thistle	Yellow Creek	1.0	2004	None. Plants are growing in the riparian area along the creek.
19	Canada thistle	Robbers Roost at the end of the 27N14B Rd	.01	2003	Plants pulled and bagged in 2003 and 2004.
22	Canada thistle	Ruffa Ranch	.25	2004	None. Plants are in a meadow near a spring.
23	Canada thistle	Yellow Creek	.01	2004	None. Plants are located on a gravel bar along the creek.
96	Yellow starthistle	Humbug Road	.01	2004	All plants pulled and bagged.

Non-Project Dependent Vectors

Livestock, vehicles, and road maintenance equipment are the most important non-project dependent vectors of noxious weeds in the analysis area. Traffic is typically light on the many roads in the analysis area, with the exception of the Humboldt and Humbug roads (County roads 307 and 308, respectively). These roads receive moderate traffic from recreational users, hunters, and logging equipment. On all roads, there is a potential for road maintenance to spread noxious weeds along roadsides within the project boundary. However, there are few known weed infestations along the roads in the Creeks project and these sites are currently being treated by hand-pulling methods. Livestock and wildlife are also present in the analysis area and can serve as potential non-project vectors, posing an additional risk for spreading noxious weed infestations. Thus, the potential risk of noxious weed invasion from non-project dependant vectors appears to be low to moderate.

Proposed Action Dependent Factors

Habitat Alteration Expected as a Result of Project

The Creeks Project analysis area consists of approximately 32,570 acres of public and private lands, with approximately 10,435 acres proposed for treatment as described in the Proposed Action for the Creeks Forest Health Recovery Project, as hereby incorporated by reference. This project intends to use a combination of commercial timber sales, service contacts, and force account crews to 1) develop a network of Defensible Fuel Zones (DFPZs), 2) establish selection harvest units, and 3) conduct area thinning on National Forest land. The

proposed treatments include approximately 5,905 acres of DFPZs, 3,285 acres of area thinning, and 1,245 of group selection units. Included in this project are the construction of 1.9 miles of new system roads and 8.7 miles of temporary roads, and the decommissioning of 1.2 miles of roads.

The proposed action would cause soil disturbance and remove shade and duff throughout the project area. Such actions pose a potential risk of noxious weed invasion, due to extensive acreage that would be treated during project implementation. Construction of DFPZs also poses a high weed risk since work is done in the narrow corridor along roads where noxious weed infestations are most likely to establish. In group selection units there would be an increased amount of ground disturbance and much of the canopy cover would be removed. In addition, duff removal and some soil compaction would also take place in concentrated areas, especially within the tractor logged units. Such disturbance creates conditions that favor weed establishment. However, group selection and area treatment units are not located along roads with known infestations of noxious weed species. Outside of treatment units within the project area little habitat alteration would take place and the potential risk of noxious weed invasion appears to be low. Overall, the potential risk of noxious weed invasion from project level habitat alternation appears to be high, due to the extensive amount of ground that would be disturbed during project implementation.

Increased Vectors as a Result of Project Implementation

No permanent structures would be built during project implementation. Fore the transportation system, approximately 1.9 miles of existing roads would be upgraded to permanent road status. Approximately 8.7 miles of temporary roads would be constructed, with 5.0 miles using existing unclassified roads, and constructing approximately 3.7 miles of new temporary roads to access treatment units. All temporary roads would be decommissioned after project completion. In addition, approximately 1.2 miles of permanent roads would also be decommissioned. Road maintenance activities would be needed on a all roads that would be utilized during project implementation. Construction of temporary road and increased traffic from workers during the project could raise the risk of noxious weed introduction, transport, and establishment. Overall, the potential risk posed by increased vectors appears to be moderate due to the extensive amount of ground that would be disturbed for road construction and maintenance.

Integrated Design Features

The following Integrated Design Features (IDFs), adopted in full, would substantially lower the risk factors described in this document.

- All off-road equipment would be weed-free upon entering the Forest (C-clause CT.36). If new occurrences of noxious weeds were identified during treatment implementation, equipment used would be washed after leaving an infested area and before entering an un-infested area. Staging of equipment would be in weed free areas.
- Known noxious weed infestations would be identified, flagged where possible, and mapped for this project. Identified sit3es within or adjacent to the project area containing isolated patches with small plant numbers would be treated (hand pulled or dug) prior to project implementation. This includes all known Canada thistle occurrences along Butt Creek in the robbers Roost Area. Any larger or unpullable infestations would be avoided by harvesting equipment to prevent spreading weeds within the project.

- Small infestations identified during project implementation would be evaluated and treated (hand pulled or dug) according to the species present and project constraints. If larger infestations are identified after implementation, they would be isolated and flagged for avoidance.
- Post project monitoring for implementation and effectiveness of weed treatments and control of new infestations would be conducted as soon as possible, and for a 2-year period after completion of the project.
  If project implementation calls for mulches for fill, they would be certified weed-free.

Anticipated Weed Response to Proposed Action:

Currently the Creeks Project has no high-priority noxious weed species adjacent to or within the project area. The Creeks project also involves only low risk factors habitat vulnerability and low to moderate non-project dependant vectors. There is a high or moderate risk of increased vectors and habitat alteration from proposed project activities. However, with the incorporation if Integrated Design Features as a part of the Proposed Action, any potential risk factors for noxious weed spread and invasion within the project area would be greatly reduced. Project related vectors are addressed through mitigation, while potential non-project related vectors are not. All non-project vectors, such as livestock grazing, operate independently and would still have the potential risk of spreading weeds in even in the absence of proposed action. With all the risk factors taken into consideration, including the Integrated Design Features incorporated into the Proposed Action, there is an overall moderate risk for noxious weeds from implementing the Creeks Forest Health Recovery Project (Table B-3).

Table B-3: Summary of Risk Factors for the Creek Forest Health Recovery Project

Factors	Risk
Non-proposed Action Dependant Factors	
Known Noxious Weeds	Low priority species present: prevention high priority
Habitat Vulnerability	Low current vulnerability
Non-project Dependent Factors	Low to moderate current vulnerability
Proposed Action Dependent Factors	
Habitat Alteration Expected as a result of the Project	High risk
Increased Vectors as a Result of Project Implementation	Moderate risk
Mitigation Measures	Greatly reduced risk
Anticipated Weed Response to the Proposed Action	Moderate potential for weed spread

Costs:

Noxious weeds significantly reduce the value of public lands. Timber production, grazing, wildlife habitat and recreational opportunities are all negatively impacted by noxious weeds. Furthermore, noxious weed control is expensive and time consuming. Prevention and control of small infestations can reduce these impacts and reduce expenditures in the end. Thus, noxious weed surveys, control of small infestations, and post project monitoring are vital in reducing overall impacts and costs from noxious weeds.

Appendix C – Response to Comments

Introduction

Appendix C describes the process used to analyze, consider, and respond to public comments on the Draft Environmental Impact Statement and Proposed Action. Included in this chapter are: (1) Table C-1 listing comment identification numbers (letter/telefax/email) used in response to comments, the name of the commenter, and the organization or entity they represent; (2) Table C-2 showing all substantive comments received and forest service responses; and (3) a copy of the comment letters received from Federal, State and local agencies and elected officials. The comment statement is taken directly from the comment letters. A complete copy of each letter received is available in the project record, hereby incorporated by reference.

Summary of Comments Received

The District Ranger received 34 letters, telefaxes, and electronic mail messages about the Proposed Action and Draft EIS. These comments consisted of detailed responses to technical and other information in the DEIS. The Council on Environmental Quality (CEQ) regulation 40 CFR 1503.4 states that an agency preparing a final environmental impact statement shall assess and consider comments both individually and collectively, and shall respond by one or more of the means listed below, stating its response in the final statement. Possible responses are to:

- Modify alternatives including the proposed action
- Develop and evaluate alternatives not previously given serious consideration by the agency.
- Supplement, improve, or modify its analyses
- Make factual corrections.
- Explain why comments do not warrant further agency response.

Comment Identification Numbers

Table C-1. Commenters on the Creeks Forest Health Recovery Project DEIS.

Comment ID Number	Commenter / Representative	Organization / Entity
1	B. Sachau	Individual
2	Liz Mosher	Individual
3	Patricia Sanderson Port	United States Department of the Interior
4	Liz Mosher	Individual
5	Mira Talbott-Pope	Individual
6	Paula Shapiro	Individual
7	Ria Orans	Individual
8	Shirley Huneven	Individual
9	Roberta Childress	Individual
10	Diane Suzuki	Individual
11	Frank Stewart	Counties QLG Forester
12	Belva Dean	Individual
13	T. McMurphy	Individual
14	T. McMurphy	Individual
15	Nora Burnham	Individual
16	Thomas Kucera	Individual
17	Jim Brobeck	Butte Environmental Council
18	Don Morrill	Individual
19	Jennifer Blakesley	Individual
20	Ian Nelson	Pacific Crest Trail Association
21	Angela Leese	Individual
22	Sharon Fritsch	Individual
23	Pete Harrison	Californians for Alternatives to Toxics
24	Suellen Rowlison	Individual
25	Nova Blazej	United States Environmental Protection Agency
26	Grace Marvin	Individual
27	Chad Hanson	John Muir Project, Center for Biological Diversity
28	Stephen Sayre	Individual
29	Patricia Puterbaugh	Lassen Forest Preservation Group, Yahi Group Sierra Club
30	Dennis Odion	Institute for Computational Earth System Sciences, University of California
31	Terry Preston	Wildlife Ecology Research Center
32	David Edelson	Sierra Nevada Forest Protection Campaign
33	David Graves	Sierra Nevada Forest Protection Campaign
34	Chad Hanson	John Muir Project, Center for Biological Diversity

Comments with Responses

Table C-2 Response to comments is organized by resource area, in the same order as Chapter 3 of the FEIS, followed by comments referring to mapping, errors and inconsistencies, and other comments. The first column indicates the comment identification number, followed by the comment number identified in the letter/telefax/email. The second column contains the text of the comment. The third column contains the Forest Service response to the comment.

Table C-2. Comment Identification Number, Comment and Forest Service Response.

Comment #	Comment	Response
Silviculture Resources		
1-3	Trees have withstood insect attacks for milenniums. they can do that now. to cut them down because of this reason makes no sense.	Insects are a natural part of the forest ecosystem. Trees that are relatively healthy (tree growth is not suppressed because of injury, disease or other stress factors such as drought and inter-tree competition) can generally withstand insect attacks. Of concern are forest stands that have become increasingly dense as a result of exclusion of disturbance. Dense stands that are under stress for resources are much less capable of resisting insect attacks. Please refer to the Silviculture Resources; Forest Health section in Chapter 3 of the FEIS for further discussion of the relationship of stand density and insect-related mortality.
11-3	In Table S-4 under DFPZ, you need to include a Crown Closure target of 40% so that the public has an idea of what the thinned stands will look like. Although you are using crown bulk density as a measure, it is more important that you use a term and concept that the public can relate to. Since the enviros are going to appeal the activities that take owl habitat out of the "suitability" category, it is critically important that 40% crown closure targets be established for all DFPZ and area thinning aspects of this operation. Since 40% crown closure provides foraging habitat for the owl and safe conditions for fire suppression activities (including aerial retardant reaching the ground), then I suggest you establish 40% as the target and floor and move on.	Table S-4 (Creeks Project DEIS) was a summary of effects to Fire, Fuels, and Air Quality by Alternative. Crown bulk density, as opposed to stand canopy cover, is a fuels parameter used in predicting and modeling crown fire behavior. Please refer to the purpose and need and prescription elements in the Creeks Project FEIS Chapters 1 and 2. DFPZ treatments within CWHR 5M, 5D and 6 class stands would retain between 40% - 50% canopy cover. Area Thin treatments in CWHR 4M, 4D, 5M, 5D and 6 class stands would retain between 40% - 50% canopy cover. In all other CWHR types a range of 30% - 50% canopy cover would be retained. The range of canopy covers provides for breaking up ladder and canopy fuel concentrations and promoting the growth and vigor of residual trees by reducing stand densities.
11-8	The last sentence on page 27 must be turned around to the following to represent the true purpose for the use of group selection: Group selections are intended to maintain a relatively continuous forest cover, create a forest that would closely mimic the historical natural landscapes of the Sierra Nevada, employ rotation ages that vary by site quality and promote an adequate timber supply to support local economic stability. This clarifies the use of groups and the fact that sawlogs are a bi-product of forest restoration practices.	Please see response to comment 11-1.

Comment #	Comment	Response
11-12	Tables 3-3 on page 67, considerable acreage is projected to fall from 4M to 4P within the DFPZ segments because there is no 40% crown closure target for the canopy thinning aspects of this project. Rather than created non-suitable owl habitat, why aren't you setting a floor target of 40% for canopy closure requirements. The standards and guides within the 2004 SNFramework provide flexibility for folks on the ground to achieve both fuel reduction and suitable owl habitat concerns of this project. Since measurement of the actual crown closure is quite subjective, it would appear that some reasonableness needs to be applied to marking prescriptions in the field.	Please see response to comment 11-3.
11-13	Several of the group selection stands I viewed in the field will have considerable volume and number of trees exceeding 30 inches in the post phase of this operation. As such, does post treatment CWHR Class 1 really represent all of the acres treated under group selection as shown in Table 3-5 on page 71?	Groups may contain some residual overstory trees since trees 30" dbh or larger would not be removed, except as required for operability. Groups would be installed where residual overstory trees are few such that conifer regeneration would be supported. The predominant strata post-treatment would be CWHR class 1.
11-14	The Total Acres Change for 4P and 4M in Table 3-6 clearly show why a 40% crown closure target needs to be implemented for this and other DFPZ projects. By thinning the crowns to 40%, suitable owl habitat is maintained along with the number of acres in the Pre Treatment conditions of 4P and 4M stands.	Stands that have a preexisting canopy cover greater than 40% and are thinned to a lower canopy level would not be dropped below 30% canopy. This minimum does not equate to an absolute value for all treated stands typed as CWHR class 4P after thinning. More accurately, these stands would have a residual canopy cover between 30% - 39%, and in some cases may actually average 40%. Post treatment CWHR density classes were conservatively estimated to account for difficulties in precise canopy closure measurements. The changes in acres of CWHR classes within the project area listed in table 3-6 reflects changes in size class as well as crown density classes. Note that the acres of decrease in CWHR class 4M does not equate to the acres of increase in CWHR class 4P. Because the DFPZ treatments are thinning from below, some CWHR 4M stands change to 5M and 5P post-treatment. Additionally, some CWHR 3M stands change to 4P post-treatment. The majority of increase of acres of CWHR 4P is, however, a result of decreased acres of CWHR class 4M. The thinning treatments also consider the fact that the stands would continue to grow through time and canopy cover would increase. Over one to three decades, canopy closure in thinned CWHR class 4P stands is projected to exceed 40% and stands would again begin to approach high density levels. An average canopy cover of 40% does not of itself define suitable owl habitat. The proposed DFPZ treatments reduce overall canopy cover but increase average stand diameters and promote the health and vigor of the retained large overstory trees.
11-16	In the Desired Fuels Condition/Fire Behavior section, starting on page 87, it would help if you would specify a target percentage for crown closure that meets the desired Crown Bulk Density. At the bottom of paragraph two on page 88, you again set a 30-40% range as the floor target for canopy closure. Twenty percent is a broad range and it should not be set to drive 4M stands from suitable owl habitat into 4P stands that are designated non-suitable owl habitat. Again, the Acts and standards	The canopy closure range of 30% - 50% was developed to provide for flexibility on the ground to address a variety of stand conditions. Please refer to the purpose and need and prescription elements in Chapters 1 and 2 of the FEIS. DFPZ treatments within CWHR 5M, 5D and 6 class stands would retain between 40% - 50% canopy cover. Area Thin treatments in CWHR 4M, 4D, 5M, 5D and 6 class stands would retain between 40% - 50% canopy cover. The range of canopy covers provides for

Comment #	Comment	Response
	and guidelines allow this flexibility on the ground and should be used by the folks that designate the trees.	breaking up ladder and canopy fuel concentrations and promoting the growth and vigor of residual trees by reducing stand densities. These design elements comply with the SNFPA 2004 ROD, Table 2
11-18	The last sentence at the bottom of page 110 and the fourth sentence on page 112 under environmental affects, clearly explains why it is imperative that 40% crown closure be established as the floor for suitable owl habitat within a DFPZ or area thinning unit. Since 40% canopy closure meets the crown spacing requirement to bring a crown fire to the ground and still meets the foraging habitat needs of the owl, then stop here and take one more issue away from the obstructionist enviros that are planning to file appeals and lawsuits against this project.	Please refer to the design elements for proposed defensible fuel profile zones in the Creeks Project FEIS Chapter 2. Within CWHR 5M and 5D class stands, a minimum of 40% crown closure would be retained. In all other CWHR types a range of 30% - 50% canopy cover would be retained. The range of canopy covers provides for creating separation of crown fuels, thinning undesirably dense pockets, and retaining stand densities to support the health and vigor of desirable leave trees. Thinning dense pockets and creating crown separation of desirable leave trees in stands that currently average near 40% canopy closure would reduce canopy cover between 5% - 10%, dropping the stand average canopy cover between 30% and 40%. These design elements provide for versatility for project implementation to treat areas of high fuel accumulations and comply with the SNFPA 2004 ROD, Table 2.
17-1	I support the use of group selection harvest when it is warranted to meet the need for diversity in forest structure and speciation. Unlike some California forest areas, the Creeks project area contains a great deal of structural diversity. The even spread of GS treatments throughout the project indicate that placement is based on economic opportunity rather than ecological need. This view (taken from Ruffa Ranch) of a slope that is slated for GS installation shows ample structural diversity to meet ecological need: Group selection is an expensive, high maintenance procedure that should be used judiciously to meet ecological goals, not as a short term economic boost.	Please refer to Chapter 1 for purpose and need for group selection (Creeks Project FEIS). Group selection is proposed to implement direction in the 1998 HFQLG Act to achieve an all-age, multi-story, fire resilient mosaic of timber stands while contributing to the local economy through a sustainable output of forest products. The purpose of group selections is to provide for future overstory pine by creating conditions supportive for pine seedlings that otherwise would not grow well in a shaded environment underneath an overstory. Group selections were placed predominantly in CWHR class 4M stands that were determined suitable for this system of uneven aged management. Groups were installed over approximately 5.7% of the land base determined available and suitable for group selection.
17-3	The DEIS states that "Control of competing vegetation would be needed on approximately 900 acres to ensure the survival and growth of young conifer seedlings." Of course it will be needed to control invasive exotic plants and fuel loads too. The expenses associated with planting and grooming these small clear-cuts should be clearly compared with the income generated. Groups located in remote areas will be especially expensive to maintain. Taxpayers should not be footing the bill to facilitate transfers to private industrial timber contractors. It is wishful thinking to imagine that shrub response will not occur on the hundreds of proposed GS clear cuts. Skinner's assessment (Creeks DEIS, page 136) that groups may be too small for shrubs to develop may be true on some plots, but there will certainly be shrub release on many of the groups. This photo on the project shows robust shrub response in a roadside clearing next to a proposed GS. *(several photos incorporated with comment)*	Reforestation of group selections which includes control of competing vegetation is funded by timber receipts from the group selection harvest as mandated by the Knutson-Vandenberg act. Research on vegetation growth in group selections indicate that growth is typically slow in small openings (less than one acre) because adjacent tree roots are capturing most of the available resources. In larger openings (between one and two acres) vegetation growth increases near the center of openings, but is suppressed nearer the edges within the rooting zone of border trees (McDonald and Fiddler, 1991). Observations of vegetation growth in plantations and thinned stands on the Almanor District support these findings. Vegetation growth within group selections are expected to exhibit similar results of suppressed growth rates within the rooting zones of overstory trees and areas of more rapid vegetation growth in the centers of larger groups.
17-4	Photograph of robust shrub response in a roadside clearing next to a proposed GS. *(Photo incorporated with comment)*	The photograph does display an area of advanced brush growth adjacent to a road. What is not depicted is the length of time the opening has persisted to develop the

Comment #	Comment	Response
		current vegetation. The example of brush growth does not take into account reforestation and vegetation control that is proposed with the group selection treatments (FEIS, Chapter 2). Additionally, roads are areas kept essentially permanently open, creating an edge devoid of overstory roots that would otherwise compete for site resources. Subsequent pictures of plantations show a dense understory of brush overtopped by established pine saplings. These plantations are approximately 30 years old. The brush growth is representative of large open grown (no overstory canopy) conditions on high to moderately high productivity sites in the absence of brush control. No brush control has occurred within these stands for over 20 years. These stands are proposed for treatment as part of the DFPZ (FEIS, Chapter 2).
17-7	Regeneration efforts within GS areas could be affected by livestock within active allotments, which at this time includes approximately 35% of the Creeks project area (Creeks DEIS pg 204).	The concern is noted. Livestock impacts to plantations within the Creeks Project and the Almanor District in general have been low. Surveys of plantations have shown damage to conifer seedlings from livestock to be minor or non-existent in virtually all plantations. Several factors affect livestock impact and include amounts of vegetation, palatability, and proximity to water. The size, scattered locations, and vegetation growth within group selections is not expected to encourage excessive use and damage by livestock.
17-8	Monitoring of remote GS locations may be ineffective, resulting in failed reforestation efforts.	Group selections would be monitored for reforestation in the same fashion as plantations as required under the National Forest Management Act of 1976.
17-10	Group selections are small scale plantations. The small scale certainly raises the cost of maintenance because of the widely spaced distribution of the work sites. Shrub response to sunlight will increase fire hazard and decrease conifer productivity. Other plantations within the Creeks project show vigorous shrub response. *(Several photos incorporated with comment)*	Research on vegetation growth in group selections indicate that growth is typically slow in small openings (less than one acre) because adjacent tree roots are capturing most of the available resources. In larger openings (between one and two acres) vegetation growth increases near the center of openings, but is suppressed nearer the edges within the rooting zone of border trees (McDonald and Fiddler, 1991). Observations of vegetation growth in plantations and thinned stands on the Almanor District support these findings. Vegetation growth within group selections are expected to exhibit similar results of suppressed growth rates within the rooting zones of overstory trees and areas of more rapid vegetation growth in the centers of larger groups. The FEIS includes treatment of vegetation within group selections to reduce competition with conifer seedling growth (Chapter 2). Live shrub cover serves as a variable level of fire hazard. Throughout much of the growing season, shrubs serve as a "heat sink" and are fire resistant because of their live moisture content. In extreme hot and dry conditions, plant moisture can drop to levels that make shrubs increasingly flammable.
17-12	Photograph 2 of N40º08.221', W121º18.321' plantation with robust shrub component.	Plantations typically have a moderate to heavy shrub component. However this is lost over time as conifer cover increases. The type of harvest prescription that led to the shrub cover is no longer used, hence a slowly decreasing amount of shrub cover is found across the landscape (FEIS, Chapter 3, Silvicultural resources).
17-23	Crown closure in a thinned area that would be thinned more under this plan. This	The series of photographs appear to be used to indicate that open grown vegetation

Comment #	Comment	Response
	amount of canopy may be needed to prevent shrub explosion. *(Several photos incorporated with comment)*	growth in older plantations (approximately 30 years old with no vegetation control treatments in over 20 years) would reflect vegetation growth expected to occur in thinned DFPZs. The photographed plantations represent large openings (clearcuts) that were cleared to mineral soil prior to reforestation. The photographs provided for display of vegetation growth, including the one depicting manzanita growth on page 7, do not portray typical stand structures of proposed DFPZs. Proposed DFPZ treatments would retain overstory canopy and would not create the same level of soil disturbance as occurred in older site prepped plantations. Vegetation growth is expected to occur within DFPZs and maintenance is expected to be implemented in most stands in approximately 5 to 10 years (FEIS, Appendix A). Stands that have been previously thinned, such as pictured on page 8, and are scheduled for additional treatment, as DFPZs would have very little material removed to meet desired conditions. Treatments in these stands would be focused on thinning undesirable ladder fuels and dense pockets and treating surface fuel concentrations. The photograph of aerial fuels (canopy cover) on page 8 shows an area of crown separation that likely would require little if any additional thinning. The pictures portrayed as a DFPZ thin on page 9 are not of a DFPZ. Based on the location provided, this stand was thinned approximately 15 years ago under other management objectives. No further treatments have occurred in this stand. In contrast, a DFPZ stand would be monitored and treated for maintenance (FEIS, Appendix A). The photograph on page 10 is of the same 30 year old plantation pictured on page 4. This stand is included in the proposed action for DFPZ treatment, including treatment of the brush.
17-27	The Creeks DEIS claims that "canopies would not be so reduced as to allow more than minor increases in the amount of forbs and shrubs within stands." This statement is unfounded and contradicted by field observations. Shrub response will be variable according to aspect, seed source and existing specimens.	Understory vegetation establishment and growth is influenced by a number of factors including propagation source (are plants or seed already on site) and availability of resources such as nutrients, growing space, water and sunlight. Residual overstory structure in the DFPZ and Area Thin units would have a dominant influence on understory plant growth as the trees dominate for resource use. Vegetation growth projections are based on post-treatment stand structure as described in Chapter 3 of the FEIS. Growth projections incorporate observations of vegetation growth in plantations and thinned stands on the Almanor District. Research on vegetation growth indicates that growth is typically slow in small openings (less than one acre) because adjacent tree roots are capturing most of the available resources. In larger openings (between one and two acres) vegetation growth increases near the center of openings, but is suppressed nearer the edges within the rooting zone of border trees (McDonald and Fiddler, 1991). The commenter is correct that shrub response would be affected by aspect, seed source and existing vegetation (or lack of).

Comment #	Comment	Response
17-32	Photograph of [italics]Arceuthobium spp.[italics] (dwarf mistletoe).	For clarification, the referenced statement in the DEIS is "With no treatment and continued wildfire suppression, levels of mistletoe infection would increase and mistletoe would spread." Dwarf mistletoe spreads from tree to tree, particularly from overstory trees to understory trees. True fir dwarf mistletoe is the predominant species of mistletoe in the project area and white fir is the species most infected in the project area. Dwarf mistletoe infection levels would increase and spread in the absence of thinning or wildfire as stand compositions continue to shift to higher proportions of shade tolerant white fir. White fir can propagate in a shaded understory environment and can persist at higher stand densities than pine.
17-33	The Stand Density Index used to analyze DFPZ "C" seems to be a silvicultural rather than forest health standard. The DEIS on page 65 mentions "competition for resources at these densities [65-85% of maximum] causes overall stand growth and vigor and individual tree mortality." The 2004 SNFPA ROD 2004 recommends 4 snags/acre in mixed conifer and 6 snags/acre in red fir as a means to maintain sufficient snags across the landscape to ensure habitat for snag dependent species. Table 3-22 of the DEIS indicates that only 3 snags/acre exist. Using SDI prescriptions across the landscape will reduce snag recruitment. The only increase expected is associated with follow-up prescribed burns, but these snags would be derived primarily from the smaller sized trees rather than the larger snags preferred by cavity nesters [DEIS pg 106]. Historically, projects similar to this have led to reductions of snags within the treated areas. The ongoing sales would continue local declines as new mortality is removed, either during the tree selection process or to promote worker safety. The thinned canopy will discourage use by species found in healthy Sierra forests that prefer dense canopy (California Spotted Owl, Northern Goshawk, Martin). Yet the Creeks DEIS insists that thinning timber stands (as opposed to thinning small diameter stems only) will contribute to overall forest health.	Density induced mortality is generally attributed to stand densities above 60% of maximum. Individual tree mortality is often caused by multiple factors and occurs in stands that are below maximum density levels. High stand densities increase the risk for large scale (multiple tree) mortality from bug kill as well as individual tree mortality. The analysis recognizes that DFPZ and Area Thinning would likely reduce but not preclude the recruitment of snags. Trees that are over 30" dbh and are highly infected with mistletoe or have root disease or other forms of advanced disease or damage are likely candidates for snag recruitment. It is recognized that the term "stand health" can have a multitude of meanings based on a specific resource or habitat component. Proposed treatments are designed to retain a desirable component of snags and promote the vigor and growth of residual trees. Please refer to Chapter 3 of the FEIS for analysis of effects of canopy density reduction to California spotted owl, northern goshawk and martin habitat (Silvicultural Resources and Wildlife sections).
17-34	The use of the term "overmature trees" [page 63] illustrates the silvicultural bias of this "Forest Health" project. This offensive term would never be applied to human senior citizens and, considering the high habitat value associated with large old trees, should not be used by public land forest managers.	Overmature trees is a commonly used silvicultural term to describe trees or stands that have a decline in vigor and net growth increment attributable to age. As used, the term describes trees that are more susceptible to bark beetle attack. This is a recognized condition and is not meant to infer a value judgment regarding habitat or any other resource.
17-37	The goals of the Creeks project are silvicultural (optimize stand growth and minimize individual tree mortality) rather than ecological. Forest health can not be defined by agricultural standards. Efficient fiber production is not an accurate representation of forest health.	Please refer to Chapter 1 for purpose and need (Creeks Project FEIS). The purpose of the fuel treatments is to reduce the potential size and intensity of wildfires and provide fire suppression personnel safe locations for taking action against wildfires. The purpose of area thinning is to promote healthy (non-suppressed) stand growth and reduce fuel concentrations in support of the DFPZ network. Group selection is proposed to implement direction in the 1998 HFQLG Act to achieve an all-age, multi-story, fire resilient mosaic of timber stands while contributing to the local economy through a sustainable output of forest products. Treatments are designed to be as cost effective as possible. Please refer to the discussion of forest health in Chapter 3

Comment #	Comment	Response
		of the FEIS; fiber production is not considered a measure of forest health.
19-4	I support reasonable thinning of forest understory to reduce the severity and extent of wildfire, reduce tree mortality, reduce pine beetle infestations, and reduce the severity and extent of mistletoe infections. In many cases, understory thinning and/or burning has the potential to improve conditions for spotted owl foraging habitat. However, it is not necessary to harvest trees up to 30" in diameter (Stephens 2004), nor, in most cases, to reduce crown closure below 40-50% to achieve management goals related to fire, pine beetles, and mistletoe infections.	Please refer to the purpose and need and prescription elements in Chapter 1 and 2 of the FEIS. DFPZ treatments within CWHR 5M, 5D and 6 class stands would retain between 40% - 50% canopy cover. Area Thin treatments in CWHR 4M, 4D, 5M, 5D and 6 class stands would retain between 40% - 50% canopy cover. The canopy closure range of 30% - 50% was developed to provide for flexibility on the ground to address a variety of stand conditions. The range of canopy covers provides for breaking up ladder and canopy fuel concentrations and promoting the growth and vigor of residual trees by reducing stand densities. The upper diameter limit of 30" would cause retention of mistletoe infection in overstory trees that would then spread into adjacent susceptible overstory and understory trees. Overall infection levels would be reduced by selectively removing infected trees and favoring retention of non-susceptible species. Most cut trees would be 20" dbh or less, however, the upper diameter limit of 30" allows for maintaining stand heterogeneity and breaking up canopy fuels by selectively retaining healthy. Proposed treatments are projected to keep stands fully stocked at densities that would support healthy (non-suppressed) growth and vigor of the stands for approximately 20 years. As stands continue to grow increasingly dense, inter-tree competition for site resources would again begin to increase and suppress individual tree growth and vigor.
19-9	I think it is unconscionable that "a decision on DFPZ maintenance would not be made at this time" (DEIS p. 29). Fire simulation modeling showed that without maintenance, a wildfire in a typical DFPZ stand 20 years post-harvest would result in "almost complete stand mortality" (DEIS p. 93). This is ultimately a worse scenario than wildfire simulation results under Alternative 2 (no action) in 20 years (p. 97).	DFPZ maintenance is identified in the FEIS as a future foreseeable action (Appendix A); the FEIS does not state that maintenance would not be conducted, only that a decision would not be made at this time. It is recognized that maintenance is key to maintaining the function of a DFPZ.
19-10	The DEIS (p. 72) states that "Treatment prescriptions preclude the harvest of trees 30 inches in diameter and larger; however, in some cases, these trees may need to be cut to facilitate operability…These cases could include: clearing for landings, cable yarding corridors, road construction, and hazard tree removal." Given that nearly all of the proposed harvesting would occur in stands dominated by trees < 24" in diameter, harvest of trees > 30" in diameter could and should be easily avoided, with the single exception for hazard tree removal.	The comment is noted. Harvest operations would be designed to minimize impacts to trees 30" dbh and larger (FEIS, Chapters 2 and 3).
22-2	I have been told that "same-age forests" are highly flamable, and I have been shown photos of huge amounts cut and dried branches lining Cohasset's alternate escape route, so I am not inclined to believe that this "management" is designed to reduce the risk of forest fires. It seems to me that recent forest management practices are designed for maximum short-term profits, perhaps to reduce government debt at both the state and federal level.	Please refer to the purpose and need in Chapter 1 of the FEIS and the discussion of fire and fuels in Chapter 3 of the FEIS. Fire behavior is influenced by a number of factors including forest structure and the amount of live and dead fuels. The age of a forest stand or whether it is "same age" is not a good indicator of fire behavior. Proposed fuels treatments are designed to achieve the purpose and need as stated in the FEIS.
23-1	CATs [Californians for Alternatives to Toxics] commends the Almanor Ranger District and Lassen National Forest (hereafter referred to collectively as "the Forest") for its efforts to address hazardous fire conditions and improve overall forest health. We	Information and discussion of the use of an EPA registered borate compound on cut stumps is included in Chapter 3 of the FEIS. Please see appendix A of the FEIS for discussion of DFPZ maintenance.

Comment #	Comment	Response
	applaud the Forest for its history of preferring non-herbicide vegetation management and treatment methods. However, we have several concerns regarding the Creeks Forest Health Recovery (Creeks) Project. CATs is opposed to the unnecessary inclusion of a pesticide, "an EPA registered borate compound (pg. 44), most likely Sporax (100% borax, sodium tetraborate decahydrate) to be applied on DFPZ and fuel treatment areas with no analysis or evaluation of different alternatives or potential environmental effects. We are also concerned with the Forest's failure to include future DFPZ fuels monitoring and maintenance, and an excessive thinning design.	
23-2	In its current form the DEIS is inadequate and unacceptable. We do not accept its failure to include non-pesticide annosum root disease prevention alternatives, non-disclosure of any borax analysis and failure to include DFPZ maintenance plans. The DEIS demands further investigation of alternative methods with greater efficacy for achieving the desired project goals. CATs Californians for Alternatives to Toxics] asks that the Forest investigate and incorporate use of non-chemical (non-borax) alternatives for preventing annosus root disease. We also want the Forest to include fuels monitoring and expected maintenance activities into the proposed actions. The Forest should commit now to prescribed fire, hand, and mechanical (non-herbicide) maintenance treatment methods within the FEIS and as part of the proposed actions.	Information regarding alternatives is included in the FEIS (Chapter 2). The Creeks Project FEIS (Chapter 3, Silvicultural Resources section) considered alternative treatments for preventing annosus root disease such as the use of prescribed burning, timing, cultural control and treating with Phlebiopsis gigantea in the analysis. DFPZ maintenance is discussed in Appendix A of the FEIS. Expected DFPZ maintenance does not include the use of herbicides. Monitoring would occur prior to maintenance to determine and schedule maintenance treatments. DFPZ maintenance is a future foreseeable action that is included in cumulative effects analysis.
23-3	Borax Use - Application of any pesticide is controversial and comes with inherent hazards and risks. These potential effects and impacts must be accounted for, analyzed, and evaluated as alternatives and under environmental effects as part of the NEPA environmental impact assessment process. The use of borax is no different. A project of this size requires the completion of a project specific risk analysis and evaluation of any pesticide to be applied over a total of 10,435 acres (5,905 acres of DFPZs, 3,285 acres of thinnings, and 1,245 acres of group selection harvests). CATs expects the Forest to provide a project specific risk analysis and evaluation of human health safety and environmental impacts within the FEIS if borax is to remain part of the proposed actions. We also expect to see non-borax annosus root disease alternatives evaluated and included within the FEIS. Inadequate Pesticide Application Information Disclosure While we support the prevention and control of Heterobasidion annosum and annosus root disease, CATs questions the wisdom and necessity of the Forest's inclusion of borax as part of the proposed actions. The Forest provides very little information regarding their proposed use of this toxic chemical. All we know from looking at the DEIS is that cut stumps of live true fir and pine trees would be treated with an EPA registered borate compound on stumps 14 inches in diameter or greater (pg.44). Since we are never told differently, we must assume that borax will also be	Information regarding health, safety, and environmental effects as well as discussion of alternative treatment methods can be found in Chapter 3 of the FEIS (Silvicultural Resources section). Information regarding application rates, timing and locations can be found in Chapter 3 of the FEIS (Silvicultural Resources section). All applicable Federal and California State rules and regulations, including requirements for safety, worker protection, storage, and environmental protection, would be implemented.

Comment #	Comment	Response
	applied over all 10,435 acres of DFPZ, thinnings, and Group Selection cuts for the proposed actions. The Forest must provide a comprehensive description of the proposed borax applications, and the criteria that will define and determine them within the EIS. How much total borax will be used? Typically borax is applied at a rate of approximately one pound per an acre. Is the Forest planning on applying 10,435 pounds of pesticides as part of the proposed actions? The potential of using such an extreme amount of pesticides over such a vast area requires the Forest to prepare a project specific risk analysis and evaluation of borax. Not doing so shows a lack of concern for both human and environmental health. Over what total acreage will pesticides be applied? Will borax actually be used over all 10,435 acres proposed for DFPZ and fuel treatment thinnings and group selection cuts? The Forest must clearly state within the EIS the actual acreage and determining factors for identifying potential borax treatment locations within the project area. Could annosus root disease spread be reduced without using borax in some treatment units or project areas? Do all stumps 14 inches in diameter and all true fir and pine tree species 'need' borax treatments? Are there other options? Where exactly will borax be used within the project area? Will each qualifying stump in each treatment unit in all of the DFPZ and timber harvest areas receive borax? What kind of terrain, aspect, slope, soils, and vegetation density will borax be applied? At what proximity to water sources might it be applied? At what proximity to sensitive and non-targeted native vegetation will borax be applied? At what proximity to wildlife, including TE&S, MIS, and species of special concern, will borax be applied? What safety precautions will be taken to protect all of these resources? All this information should be clearly defined and made easily accessible within the EIS. What time of year and under what weather conditions will it be applied? Are there times that borax use would not be needed (like hot dry times)? Are there weather conditions that would prohibit the use of borax (rainy or wet and causing it to easily wash off stumps)? All application criteria and safety designs must be included in the EIS. What safety measures are being taken to protect workers, the public, and resident plants and wildlife? What non-target species might be impacted including sensitive,	

Comment #	Comment	Response
	rare, and listed species? It is not acceptable to simply rely or refer to label requirements and the Forest must list these precautions within the EIS. As of now the DEIS is incomplete and inadequate regarding pesticide safety measures, and analysis of human health hazards and potential environmental effects. What are the alternatives? Does the Forest really need to use borax? What other management methods and treatment options have been considered? What are the cumulative impacts of using borate compounds in this watershed? This is all information that must be included for adequate environmental analysis under NEPA. At this point the Forest has failed to provide non-borax alternatives for annosus root rot disease prevention, given no options for using less borax, and disregarded analyses of potential environmental effects, including human health risks. The Forest appears to believe that because it will be using an EPA and California registered pesticide that is does not need to include any pesticide use analyses, an assumption that is incorrect and fails to comply with NEPA requirements.	
23-4	Borax Need And Effectiveness - "Annosus root disease is a normal part of most forest ecosystems in the West contributing to structural and compositional diversity" (Schmitt et al. 2000). CATs would like to raise the issue of whether or not borax treatments are needed for this project. The Forest states that annosum root rot disease occurs in stands throughout the project area (pg. 63). While the occurrence of root rot disease within the project area certainly justifies consideration of borax treatments, it may not be the most effective, or ecologically sound method to prevent annosus spread. The Forest has failed to analyze and evaluate non-borax prevention methods within the EIS process as required by NEPA. A reasonable range of feasible alternatives must be objectively evaluated (see alternatives discussion below). CATs would like to raise the issue of whether or not borax treatments are universally effective for annosus root rot prevention. Evidence exists, that borax may not be effective, and the Forest fails to acknowledge this. The Forest must disclose all information, even opposing scientific views within NEPA documentation. In a study review of research on annosus root rot disease, US Forest Service Region 5 scientist R.S. Smith Jr. reported, "there is continuing concern that annosus can infect stumps via the roots rather than just through the stump surface, and that borax treatment may not be fully successful in preventing the disease" (1989). Also an even more interesting study was done by Region 5 Forest Service scientists, which reviewed the efficacy of borax stump treatment in protecting trees from annosus root	Discussion of the use of a borate compound and analysis of alternative treatment methods is included in the FEIS (Chapter 3, Silvicultural Resources section).

Comment #	Comment	Response
	disease. The authors reported that borax might be ineffective because it washes off stumps and that high stump densities in thinning harvests make it difficult to apply. Evaluation done twenty years after thinning operations revealed that plots with borax-treated stumps did not have significantly lower annosus infection than did untreated stands" (Edmonds at al. 1989). The use of Sporax in already infested stands may worsen the problem by preventing natural annosus competitors from entering stumps (Ammon and Patel 2000). Stump treatment with borax is only recommended for sites with known annosus root disease potential and where cultural control is not viable (Schmitt et al. 2000). Has any cultural control been proposed, evaluated or analyzed? The Forest Service needs to analyze annosus disease prevention alternatives for this project.	
23-5	Alternatives - The alternatives section of an EIS is the foundation, the crux of NEPA analysis, information disclosure, and project options evaluation. Not only has the Forest only provided one action alternative (not acceptable under NEPA), but at this point the Forest has failed to present a reasonable range of alternatives regarding control of annosus root rot disease. Alternatives to avoid and minimize potential environmental impacts need to be considered when ever pesticides are included as part of proposed actions. The Forest must objectively evaluate non-borax alternatives within the EIS. Studies have been done, data does exist, and scientific literature contains information regarding non-borax, alternative methods for controlling annosus root disease (see discussion below). This list of references and potential alternatives listed and discussed below should not be considered exclusive, but only as a sample of the information available to the Forest, should it take the time to research and propose pesticide free root disease control alternatives. The Forest should not rely on simply on the fact that borax has been long used or heavily used as of late. Annosus root disease has reached endemic proportions under current management practices that obviously haven't been working. Such project design and pest treatment is short sighted, lazy and constitutes a failure of responsible forest stewardship. [Following is a multi-page discussion of Alternatives For Annosum Root Disease Prevention (Non-Borax Alternatives)]	The action alternatives contain a discussion of the use of a borate compound for prevention of annosus root disease in the FEIS (Chapter 3, Silvicultural Resources section), including alternate treatment method for annosus control. CFR regulations (1502.14) call for a range of reasonable alternatives, not a "reasonable range of alternatives".
23-6	Borax Human Health Hazards - The analysis and evaluation of potential human health risks associated with borax application for this project are woefully inadequate and as far as can be seen in the DEIS, non-existent. Studies and toxicity information on borax, as discussed below, raise issues of potential human health concerns that must be addressed as part of this project within the EIS.	Information regarding health, safety, and environmental effects is included in the FEIS (Chapter 3, Silvicultural Resources section). All applicable Federal and California State rules and regulations, including requirements for safety, worker protection, storage, and environmental protection, would be implemented.

Comment #	Comment	Response
	Studies have prompted concern that borax is a human reproductive toxin (USFS 1995). The US Forest Service (1995) reports that studies indicate chronic exposure to borax may cause reproductive damage and infertility. In the US EPA's Toxicological Review of Boron and Compounds (2004) the developing fetus of mammals is considered one of the most sensitive targets. The other most sensitive target is the testes of males, and adverse effects include testicular degeneration (US EPA 2004; USFS 2003, Evaluation of Human and Ecological Risk For Borax Stump Treatments). The Forest must disclosure this information within the EIS and evaluate this risk in as part of action alternatives including borax applications. Borax has been placed in Toxicity Category I for acute eye irritation effects (US EPA 1993, RED Facts; USFS, Fact Sheet 1995). Borax is rapidly absorbed through damaged skin (USFS 1995). What precautions will the Forest be taking to protect applicators and the public from these dangers? Why is this information not disclosed or analyzed within the EIS? The US EPA warns of the potential for dermal and inhalation exposure among applicators and people reentering treated areas (US EPA 1993). The Worker Protection Standard (WPS) for Agricultural Pesticides (40 CFR 156 and 170) established an interim restricted-entry interval (REI) of 12 hours for boric acid and its sodium salts (US EPA 1993). Will the Forest be imposing any such safety requirements? Sporax has a signal word of danger and the label describes the hazards to humans and domestic animals as follows: "DANGER. Corrosive. Causes irreversible eye damage. Harmful if swallowed. Do not get in eyes or on clothing" (Wilbur-Ellis, Sporax label). Again, the Forest must disclose potential hazards associated with pesticide applications. The green consumer website reports "The most significant toxicity concerns for borax center around ingestion poisoning and its reproductive toxicity through ingestion...the California US EPA is currently evaluating it [borax] for possible consideration as a reproductive toxin under Proposition 65." The Sporax material safety data sheet warns, "Do not ingest. Wash thoroughly before eating, drinking or smoking" (Wilbur-Ellis). CATs is aware of incidences where borax has been spilled into adjacent stream systems at the staging areas. We are also aware of accidents associated with mixing that has compromised the health of workers. At a minimum, the US Forest Service	

Comment #	Comment	Response
	must develop safety protocols for mixing and staging areas and include these within the EIS. The protocols should include identification of areas suitable for staging and mixing that pose little threat to stream systems in the case of an accidental spill. Workers need to be sufficiently trained and experienced in safety procedures for mixing and transporting borax, as well as first-aid response, in the event of accidental contact or exposure. First aid materials must be readily available at all project sites, and include access to running water for flushing borax particles. This information must be described within the EIS.	
23-7	Borax Potential Environmental Effects - The analysis and evaluation of potential environmental effects associated with borax applications for this project are woefully inadequate and non-existent within the DEIS. Studies and toxicity information on borax, as discussed below, raise issues of potential environmental health concerns that must be addressed as part of this project within the EIS. Borax is generally active in soils and it remains unchanged in the soil for one year or more. High rainfall conditions can cause borax to leach rapidly and soil microorganisms do not break it down. Borax is partially soluble in water (USFS 1995). The US Forest Service (1995) warns not to apply directly to water, or to areas where surface water is present and not to contaminate water when disposing of equipment washwaters or rinsate. While boron salts have been observed to occur naturally in most unpolluted waterways, some areas have boron occurring in concentrations shown to be toxic to plants (US EPA 1993). What precautions will the Forest be taking to keep borax out of water sources? What are the potential impacts to non-targeted vegetation and aquatic species? Borax may be toxic to many essential soil microorganisms at high levels (USFS 1995) and thus may adversely affect nutrient cycling functions within the ecosystem. The EIS should contain such information and evaluation of these effects. This could mean major long-term changes in forest biodiversity from the proposed actions, especially at the extreme proposed application rates and acreage. Borax's primary breakdown product in soils is boron. While boron is an essential nutrient for plants, high levels of borax will kill vegetation and thus it can be used as a nonselective herbicide (USFS 1995). The Forest Service reports that in high concentrations borax is "lethal to plants." It is also know to bio-accumulate in plants (Phelps et al. undated). The Sporax label reinforces this concern as it states, "Borax carelessly spilled or applied to cropland or growing plants – including trees or shrubs – may kill or seriously retard plant growth" (Wilbur-Ellis). These potential impacts must be analyzed and evaluated if borax is to remain part of the proposed actions. The Forest reports that several sensitive plants exist and may be impacted by DFPZ	Information regarding health, safety, and environmental effects is included in the FEIS (Chapter 3, Silvicultural Resources section). All applicable Federal and California State rules and regulations, including requirements for safety, worker protection, storage, and environmental protection, would be implemented.

Comment #	Comment	Response
	fuel treatments, yet the DEIS fails to analyze impacts of borax on these species. The Forest Service's borax fact sheet (1995) warns "Borax may be a hazard to endangered plant species if it is applied to areas where they live" when applied as a forest fungicide on stumps. Also borax's noncrop herbicidal use may harm endangered or threatened plants. Therefore the US EPA is requiring three phytotoxicity studies (regarding seed germination, seedling emergence and vegetative vigor) to assess these risks (US EPA 1993). Are there any endangered, threatened, or sensitive plant species with potential habitat in the project area where borax applications will be taking place? How will borax applications affect both habitat and populations? Borax is used as an insecticide and "relatively high concentrations of boron compounds are toxic to insects, even when used in forests (USFS 1995). What about the impact of the proposed borax applications to beneficial insects and pollinators? What impacts could this have of biodiversity and ecosystem functioning? CATs wonders what kind of impacts borax is having on invasive plants and noxious weeds? Could borax be providing an additional disturbance and clearing space for weed proliferation? Is borax's fertilizing properties providing a soil medium friendlier for exotics than native plant species? The Forest admittedly has some noxious weed problems within the project area. While there are no studies investigating the impacts of borax on amphibians, CATs is concerned that this salt, which remains active for a year in soils, and does not naturally occur in forests, may be having major impacts on amphibian populations. Amphibians, while aquatic during reproductive and other times, also are terrestrial and travel across the land. Amphibians are especially sensitive to chemicals and are believed to be useful indicator species within forest ecosystems. Borax salts do not naturally occur within forest settings and amphibian populations have been quickly declining within forest systems. What impact on amphibian populations is occurring from the current widespread application of borax in our public forests? What potential effects could borax applications be having on sensitive amphibians within the project area? This should be included in EIS analyses. The Forest has a responsibility to answer these questions and provide analysis and comparative evaluation of borax impacts and between different annosus disease control methods within the EIS for this project. Until this information has been provided the EIS will continue to be inadequate and unacceptable under NEPA.	

Comment #	Comment	Response
23-8	DFPZ Maintenance and Monitoring - CATs [Californians for Alternatives to Toxics] is concerned over the Forest's failure to accurately address future DFPZ maintenance and monitoring. We also feel the thinning design is excessive and does not reflect site community characteristics. The courts have ruled with CATs that maintenance is inherently part of DFPZ projects and must be accounted for within project designs. By failing to include DFPZ fuels monitoring and maintenance plans as part of the proposed actions the Forest is exploiting its responsibility as stewards of public lands and setting up a situation with potentially dramatic ecological implications in the near future.	DFPZ maintenance is accounted for and included in cumulative effects analysis. Please see Appendix A of the FEIS for further information on DFPZ maintenance. Proposed thinning treatments have been designed to achieve the stated purpose and need (FEIS, Chapter 1), and to comply with management direction.
23-9	DFPZ Maintenance Plans Must Be Included In Project EIS Actions - The Herger-Feinstein Quincy Library Group Forest Recovery Act Environmental Impact Statement (HFQLG FRA EIS) is programmatic and not site-specific. While, the proposed actions must adhere to the limits and guidelines set forth by the HFQLG EIS, the Forest must provide the site-specific evaluation and cannot rely on generalist design protocol as recommended in programmatic documents. While the Forest may tier to or reference the EIS, it must provide the project-specific information that guided the project's design based on the EIS. As it stands, the proposed actions makes several references to limits set by the HFQLG EIS without providing discussion of the site-specific environmental effects of the proposed actions. The Forest has a responsibility to address and evaluate these effects as they pertain to the project area and provide the data from which management decisions are based on. The Forest cannot rely on programmatic documents to support site-specific design protocol and justify impacts. Although the Forest has made no references to using herbicides in this project, CATs is still wary of its potential use in the project area in the future, especially since the use of herbicides for maintenance is outlined in the HFQLG FEIS. We are encouraged by the Forest's prediction foreseeable future actions including DFPZ maintenance and consisting of prescribed fire, hand treatments and mechanical treatment (Appendix A, pg. 243-244). We particularly support that herbicide use is not included as a foreseeable DFPZ maintenance tool (pg. 243). However, rather than speculate and predict future DFPZ maintenance tools, we would like the forest to commit, in writing, and within the EIS, as to which tools it will use are the appropriate time. Specifically, language stating that no herbicides will be used for Creeks Project DFPZ fuel brake maintenance and that prescribed fire, hand treatments, and mechanical treatments will be the only maintenance tools utilized. CATs would also like the Forest to include within the EIS the criteria that determine which maintenance tools will be used. Maintenance is a foreseeable connected action, and as such must be covered in full detail within the Creeks Project EIS.	The Creeks FEIS has addressed DFPZ maintenance (Appendix A). Potential DFPZ maintenance treatments were identified based on local determination of vegetation types, and are tiered to the HFQLG FSEIS (2003).

Comment #	Comment	Response
	We urge the Forest to include long-term plans for maintenance of fuel levels. Maintenance estimates must include justification and specific data that back up time intervals and maintenance strategies. The Forest cannot just describe the environmental effects of the proposed treatments as being discussed in the programmatic HFQLG Forest Recovery Act. The Forest has a direct responsibility to consider the site-specific environmental effects of not considering maintenance strategies specific to the bear fuel reduction project. The Forest cannot base site-specific decisions on data that it does not publicly disclose. CATs feels that by not considering and proposing maintenance strategies specific to this project, the proposed action would establish a precedent for future actions, specifically, the likelihood of the Forest becoming dependent on an herbicide-based vegetation management strategy. CATs is opposed to any management activities that could lead the Forest onto the herbicide treadmill.	
23-10	The implementation of the proposed fuel reduction efforts, as described in the DEIS, will inherently increase light availability and disturb the soil surface. This is not conjectural, but a project actuality consistent with all timber activities, that must be analyzed by the Forest. These actions will create optimal conditions for the invasion of noxious and invasive plant species as well as undesired natives. In such an instance, undesired vegetation, or early seral species, are typically represented by annual grasses and weeds, and woody shrubs. The successful establishment of such a stratum could result in high fuel levels in as little as three to five years, or as long as five to eleven, depending on vegetation types, but all would require maintenance in the next two to five years. CATs fears such an outcome will prompt the Forest to adopt a chemical dependent maintenance strategy. We have seen other National Forests in Region 5 become herbicide dependant for vegetation management and DFPZ maintenance in similar projects. CATs is opposed to and will not support any forest management actions that will result in the potential for future herbicide use. As it stands, the Forest states in the DEIS that maintenance is planned from 5 to 30 years beyond project initiation (pg. 95). The Forest is under the false impression that the current DFPZ design will function effectively throughout this excessive time interval. CATs feels strongly the excessive thinning and group selection prescriptions will require a maintenance interval of 3-5 years and by ignoring the issue for 10-20 years, the Forest may be forced to rely upon the use of herbicides for vegetation management and fuels reduction. Based on maintenance projections a decision on what type of treatments for maintenance can be made now, and should be done as part of the proposed actions. The forest should be acting proactively rather reactively for the most effective forest management.	Timing of projected DFPZ maintenance is based on expected vegetation response FEIS, Appendix A). The range of 5 to 30 years for initial maintenance treatments accounts for differing vegetation communities and natural fire return intervals. High elevation red fir forests are expected to have slower accumulation of surface fuels and a consequent longer interval (30 years) before maintenance treatments are needed. Most of the Creeks DFPZ stands are projected to require maintenance in approximately 5 to 10 years. While ingrowth of understory vegetation would occur, accumulations of surface fuels are not expected to warrant maintenance for a minimum of 5 years, and generally not for 10 years. Observations of previous thinned stands in and near the project area support these projections.
23-11	CATs [Californians for Alternatives to Toxics] is concerned over the excessive group	The canopy closure range of 30% - 50% was developed to provide for flexibility on

Comment #	Comment	Response
	selection, thinnings, and DFPZ design characteristics. The DBH limits (30") are too high and desired canopy cover percentages (30%) are too low. CATs would support alternatives that reduce DBH limits to 12" and hopes the Forest can see beyond the 'timber dollars' and use lower and more responsible DBH limits. Adequate support for this silvicultural prescription is not provided in the DEIS. This generalized strategy for fuels reduction does not consider historical stand densities that are influenced by stand age, site productivity, vegetative communities, and site characteristics such as soils, elevation, aspect, and slope. The Forest needs to determine their desired stand density, for each specific site, each treatment unit within the project areas, based on historical stand densities that reflect the aforementioned forest dynamics. Thinning can have both positive and negative effects depending on the forest type and its existing structure and age. NEPA also requires that the Forest provide site-specific description of the project area as it pertains to the project design so that the public and the decision maker may consider these elements and submit adequate and informed comment and decisions. "Selection thinning and crown thinning that maintain multiple crown layers, along with individual tree selection systems, will not reduce the risk of crown fires except in the driest ponderosa pine forests (Graham et al 1999)." Only a very small percentage of the project area is reported in the DEIS to be ponderosa pine forests. By using predetermined, generalized DBH limits, the Forest risks either under harvesting, resulting in a static state characterized by excessive fuels, or, as in this case, over harvesting, allowing increased light availability thus providing a suitable medium for the establishment and proliferation of undesired vegetation. Both of which, will likely result in the quick return of hazardous fuel levels. This excessive thinning is the primary contributor to the actual and necessary maintenance interval likely to be needed in the next 3-8 years.	the ground to address a variety of stand conditions. Please refer to the purpose and need and prescription elements in Chapter s 1 and 2 of the FEIS. DFPZ treatments within CWHR 5M, 5D and 6 class stands would retain between 40% - 50% canopy cover. Area Thin treatments in CWHR 4M, 4D, 5M, 5D and 6 class stands would retain between 40% - 50% canopy cover. The range of canopy covers provides for breaking up ladder and canopy fuel concentrations and promoting the growth and vigor of residual trees by reducing stand densities. The range of canopy cover and dbh limits provide for treating a variety of stand conditions to achieve desired stand structures and fuel conditions as described in the purpose and need.
23-14	The proposed actions will, without doubt, establish a precedent for future actions. The Forest has demonstrated their awareness for these future actions by predicting a maintenance interval (pg. 244) but have failed to include a monitoring plan. In addition, without a firm proposal of a maintenance strategy, we are to assume the same mechanical thinning, utilized as a natural fire surrogate, may again be implemented. These mechanical strategies have shown to have a cumulative effect by increasing surface fuels and actually increasing the potential fire risk over time (Graham et al 1999, Weatherspoon 1996, Wagtendonk 1996, Stephens 1998). Although the proposed actions are rehabilitative and preventative in nature, plans for consistent long-term maintenance need to be implemented for proactive management. The proposed actions intend to return the forest to pre-historical natural conditions. But without changes in future management, the existing conditions will likely return with more severity. Specifically, the Forest should include	DFPZ maintenance is addressed in the FEIS as a future foreseeable action Appendix A). Prescribed burning is the predominant projected maintenance treatment, accounting for approximately 72% of the proposed DFPZ network. Please refer to the purpose and need for the DFPZ (FEIS, Chapter 1). The intent is to create fuel arrangements conducive to strategic wildfire suppression. These treatments would bring stands into the desired fuels Condition Class 1. Conditions Classes are used to describe changes in stand structures as the result of exclusion of natural wildfires. While proposed DFPZ treatments would more closely reflect "pre-historical natural conditions", the intent is to create a strategic defensible fuel profile zone.

Comment #	Comment	Response
	consistent prescribed burning as an element of their typical forest management practices. We commend the Forest's prediction that prescribed fire will be used as a maintenance tool. However, we insist that the Forest evaluate and incorporate a maintenance strategy, founded on prescribed burning, into the proposed action plan. The restoration of a site to pre-historically natural conditions is unlikely to be achieved with the omission of a reoccurring fire regime. We fear that negligence of future maintenance could lead to circumstances where the Forest feels that chemical treatment of vegetation would be the only viable solution. We are opposed to any forest management actions that will likely lead to future vegetation management strategies dependent upon herbicides. The Mi-Wok Ranger District of the Stanislaus National Forest is experiencing such an instance. They are currently proposing a noxious weed control project that will utilize herbicides. The project area occurs within a previously established fuel break that was neither maintained nor properly designed. Although, the herbicide is not being used for fuel reduction purposes directly, the proliferation of noxious weeds lends itself to the inferred state of the landscape; one of increased light availability, disturbed soil surface, devoid of native vegetation, and moving towards a system dominated by annual invasive species, likely contributing to surface and ladder fuels. We are opposed to actions that are likely to create similar circumstances and management repercussions.	
23-16	While CATs [Californians for Alternatives to Toxics] is aware that the harvest of timber provides the monetary means for implementing these fuel reduction efforts, the Forest needs to describe how the project area was evaluated for the purpose of making proposed stand density determinations. Such determinations should reflect the Forest's awareness for stand diversity and structure as well as maintaining reasonable fuel levels.	Please refer to Chapter 3 of the FEIS (Silvicultural Resources section). Stand density conditions were determined by field reconnaissance, forest stand inventory data and aerial photography.
27-6	Trees over 25 inches in diameter and less than 30 inches in diameter are among the largest 1% (possibly even the largest one-half of one percent) of all trees in the project area. This can only reasonably be construed as overstory removal, which the SNEP Report (1996) and the National Fire Plan have blamed for increased incidence of high severity fire. How do you explain the discrepancy between these reports and your plan to remove overstory trees ostensibly to reduce severe fire?	Overstory removal is a silvicultural system whereby the largest tees are cut and smaller (generally mid story and under story) trees are left. This is also considered a type of thinning from above, whereby all or virtually all overstory trees are removed. This leaves an open stand condition conducive to rapid brush and vegetation growth, with retained small diameter trees that have generally low canopy base heights. Please refer to thinning treatment descriptions in Chapter 2 of the FEIS; proposed treatments do not include overstory removal as referred to above.
27-7	If you disagree that trees 29.9 inches in diameter are overstory trees, please explain how and why, in light of the distribution and frequency of tree sizes in the project area.	Overstory trees are defined by their position in the canopy of the stand they occur in, as opposed to their dbh. In most stands within the Creeks Project area, trees 29.9" dbh would be considered overstory trees due to their crown position. Please refer to the DFPZ and Area Thin treatment descriptions in Chapter 2 of the FEIS for discussion of when upper story trees would be removed. Trees would be removed to break up canopy fuel continuity and protect adjacent (overstory) leave trees.

Comment #	Comment	Response
27-10	Please fully, and specifically, analyze the impacts of brush regrowth on DFPZ effectiveness at 10 and 20 years post-logging. The DEIS does not adequately address this. The increased canopy reduction caused by the 30-inch dbh limit will naturally result in a more rapid regrowth of brush, as compared to a 20-inch limit.	Understory vegetation establishment and growth is influenced by a number of factors including propagation source (are plants or seed already on site) and availability of resources such as nutrients, growing space, water and sunlight. Residual overstory structure in the DFPZ would have a dominant influence on under story plant growth as the trees dominate for resource use. Vegetation growth projections are based on post-treatment stand structure as described in Chapter 3 of the FEIS. Growth projections incorporate observations of vegetation growth in plantations and thinned stands on the Almanor District. Please see Appendix A (DFPZ maintenance) in the FEIS for further discussion of DFPZ maintenance.
27-11	The DEIS states that a primary objective of the project (for both DFPZs and group selection units, especially group selects) is propagation of shade-intolerant and fire-resistant pine species (ponderosa and sugar pine), which will supposedly increase the fire-resilience of the forest. Given this goal, why are any ponderosa and sugar pine being removed? This makes no sense, especially for healthy, mature trees 20-30" dbh. Please fully explain your rationale here, i.e., explain how removing healthy, mature, fire-resistant pine trees advances your stated goal of increasing mature, fire-resistant pines (immature pines are not fire-resistant).	Please refer to Chapter 1, purpose and need for fuel treatments, Creeks Project FEIS. The purpose of the fuel treatments is to reduce the potential size and intensity of wildfires and provide fire suppression personnel safe locations for taking action against wildfires (FEIS Chapter 1). Propagation of shade-intolerant and fire resistant species is not a stated purpose although this may be an ancillary benefit. Please refer to Chapter 1, purpose and need for group selection, Creeks Project FEIS. Group selection is proposed to implement direction in the 1998 HFQLG Act to achieve an all-age, multi-story, fire resilient mosaic of timber stands while contributing to the local economy through a sustainable output of forest products. The purpose of group selections is to provide for future overstory pine by creating conditions supportive for pine seedlings that otherwise would not grow well in a shaded environment underneath an overstory. While pine species are generally more fire resistant than other conifer species, all seedlings are vulnerable to fire, regardless of species, because they are low to the ground and have thin young bark. The term fire-resistance used in this context refers to physical characteristics, primarily bark thickness, of older larger trees.
27-12	Some of the group selection units are located in stands in which most trees 20-30" dbh are ponderosa pine. These groups would result in clearcuts, or near-clearcuts, since very few trees over 30" dbh exist in the project area. How does this meet your stated purpose and need of increasing fire-resistant (mature) ponderosa pine? Removing mature, fire-resistant ponderosa pine will only DELAY the objective of increasing the proportion of mature pine in the forested landscape because even if pine does regenerate (as opposed to fir or cedar) it will take many decades before such trees reach the maturity (and fire-resistance) of the pines that were removed.	Please refer to Chapter 1, purpose and need for group selection, Creeks Project FEIS. The purpose and need for group selection is to test the effectiveness of an uneven-aged silvicultural system in achieving an all-age, multi-story, fire resilient mosaic of timber stands while contributing to the local economy through a sustainable output of forest products. Group selection would provide favorable conditions for the establishment and growth of shade-intolerant pine species as well as provide structural diversity by creating small patches of young trees in stands of larger trees.
27-13	Some of the group selection units are at elevations and on slopes where true fir forests are natural (even historically), and predominantly ponderosa pine stands will not successfully regenerate, most likely (at least not naturally). Thus, generally thickets of young fir will regenerate in such areas. Please fully address this issue, and explain in detail how these higher elevation groups (especially those not on south-facing slopes)—located in forests where ponderosa was not naturally a	Please refer to Chapter 1, purpose and need for group selection, Creeks Project FEIS. The purpose and need for group selection is to test the effectiveness of an uneven-aged silvicultural system in achieving an all-age, multi-story, fire resilient mosaic of timber stands while contributing to the local economy through a sustainable output of forest products. The commenter incorrectly describes the purpose and need as "the stated purpose and need of increasing fire-resistant

Comment #	Comment	Response
	dominant species even in pre-settlement times—will result in meeting the stated purpose and need of increasing fire-resistant ponderosa pine.	ponderosa pine." Group selection would provide favorable conditions for the establishment and growth of shade-intolerant pine species as well as provide structural diversity by creating small patches of young trees in stands of larger trees. Shade intolerant ponderosa pine do not grow at the higher elevations of true fir forests however other shade intolerant species, including Jeffrey pine and western white pine do grow at these higher elevations.
27-14	What proportion of the commercial trees to be removed (both 10-20" dbh and 20-30" dbh) will be ponderosa pine? What proportion will be sugar pine? What proportion of the basal area to be removed will be comprised by both ponderosa pine and sugar pine? This information is crucial in order to evaluate whether you will meet the stated purpose and need.	Please refer to the purpose and need for all action alternatives, Creeks Project FEIS Chapter 1. Species removal has very little consequence in respect to evaluation of purpose and need as such trees would not be a part of the residual forest. In contrast, residual forest structure has much consequence in respect to evaluation of purpose and need. Please refer to Creeks Project FEIS Chapter 3 (Silvicultural Resources). Large fire-resilient dominant and codominant trees would be retained and irregularly spaced to provide crown fuel separation. Healthy mid-story trees and understory trees would be retained where they don't serve as ladder fuels. Species preference for retention would be given to shade intolerant trees, however, a component of all tree species would be retained to maintain species diversity.
27-15	How many trees will remain in the groups, generally, after logging?	Please refer to Chapter 3, Silvicultural Resources in the FEIS.
27-16	The 1996 SNEP Report (Vol. I, p. 63) contains a historical inset which describes observations by early settlers in the mid-1900's. It states that dense forest conditions were often reported, and that the historic forests were not consistently "open and parklike". Please fully address this, and explain the evidentiary basis for your assertion that the historic forests of the area were homogeneously open and parklike.	The FEIS does not make the assertion that the historic forests of the area were homogeneously open and park-like. The FEIS does not attempt to refute the historical occurrence of dense forest conditions. Treatments prescribed in the Creeks Project FEIS are designed to develop a strategic network of reduced fuel concentrations, promote the growth and vigor of residual overstory and understory trees, and encourage spatial heterogeneity and structural diversity within the project area.
27-17	Sudworth (1908) said that white fir and incense-cedar were common in the northern Sierra Nevada in the general area and elevations corresponding to the project area. And, Leiberg (1902) stated the same for the broader area, even in areas that were not described as having been logged. What evidence do you have that ponderosa and sugar pine are substantially lower in proportion now as compared to historic times, especially for trees >20" dbh, and also for generally south-facing slopes?	The Creeks Project DEIS did not make this assertion, nor does the FEIS. Both white fir and incense cedar are recognized components of forest types within the Creeks Project area.
27-18	Please include a figure that shows the proportion of trees (by number and basal area) in the ponderosa pine/mixed conifer, and the true fir/mixed conifer (upper elevation and mesic slopes) forests.	Neither purpose and need nor silvicultural resources identified in the DEIS are stratified by the number of trees and/or basal area by species. Please refer to the Silvicultural Resources section of Chapter 3 of the FEIS for descriptions of dominant plant communities and their distribution.
28-1	Please keep track of which trees are designated as "hazards to operations" and make a good faith effort to avoid the felling of the largest of those. The Creeks DEIS states that trees greater than 30 inches diameter would only be removed for operability as required by OSHA for a safe working environment. I dispute that OSHA requires removal of trees.	The above concerns regarding trees greater than 30" dbh are noted. Snag retention guidelines promote retaining the largest available snags for wildlife habitat. For clarification, the DEIS and FEIS states that "live trees larger than 30 inches dbh would be retained except as necessary for operability, and impacts to trees larger than 30 inches dbh would be minimized as much as practicable." (FEIS, Chapter 2).

Comment #	Comment	Response
	A review of the Revised Logger's Guidelines to the New OSHA Logging Safety Standards - FRA 95-A-14 reveals that OSHA merely requires contractors to "Remove all standing tree hazards in and around the landing area" (General Operational Safety and Loss Control Guidelines), and that "If the danger tree (defined as a 'lodged tree') is not felled, it shall be marked and no work shall be conducted within two tree lengths of it unless the employer demonstrates that a shorter distance will not create a hazard to employees" (Safety Guidelines for Chainsaw Operations). I suggest that merely locating landings so they are at least two tree-lengths outside the strike zone of very large "hazard" trees, and requiring contractors to first prune and fall dead "widow-maker" branches and lodged trees before commencement of logging operations, would go a long way toward making the general forest, including DFPZs and group selection sites, reasonably safe for both logging crews and fire suppression personnel.	
28-2	The Forest Service should start keeping track of what percentage of trees proposed for felling as "hazards" are 30 inches in diameter or larger, even if that means designating a new size and/or class of tree and doing a forest-wide or at least project area inventory of the largest trees, prior to any new operations. The largest trees, though often the oldest with more "defects", have a wildlife value that greatly exceeds their danger to humans. There are an abundance of smaller trees that can be logged to contribute to "community stability" as required with the HFQLG Act; and it is not necessary to enhance the salability of stands by including more large "hazard" trees in the mix to be logged. If any of the largest of the trees cannot be avoided or their hanging limbs removed through correctional pruning, and must be felled, then those largest logs should be left in the forest to increase the size of the course down woody material (i.e. marten habitat) left after logging operations.	The FEIS contains further discussion on the situations under which trees larger than 30 inches may be removed (see Chapter 2 for definition of operability). One of the design criteria is that if any tree designated to be retained for wildlife is removed during operations, it would be replaced with one with similar wildlife value (Chapter 2, FEIS).
28-5	I don't see any reason why the HFQLG Act-mandated group selection sites cannot be located so as to serve a dual role as SPLATs, as described by Finney, so as to allow the slowing and reduction in intensity of advancing wildfire-fronts. Scattered SPLATs are less disruptive than the linear DFPZs to migration routes for old-growth-favoring species like marten, and at least until brushy species invade and clog those group selection sites, allow a natural fire return interval into the forest during multiple-lightening-strike events when there aren't enough suppression personnel and equipment to extinguish all blazes immediately. I made this suggestion in my July 2004 comments on the Creeks Forest Health Recovery Project; but it was not addressed. "Rather than proposing so much Area Thinning to augment the effectiveness of the DFPZs within this project, why not substitute placement of some of the group selections for temporary augmentation of fuel reduction efforts ...". At least until those new pine plantations grow quite a bit, the maintenance required to release the trees would be similar to the brush-cutting	The suggestion of implementing group selections to serve as SPLATs (strategically placed area treatments) is noted. A key consideration in developing SPLATs is their orientation and overlap in the direction of expected fire spread, and the separation between SPLATs (Finney, 2001). These design elements do not lend themselves to the purpose of group selections which is to promote uneven aged stands while maintaining relatively continuous forest cover. The shapes, sizes and locations of group selections are designed to promote regeneration by creating small gaps. Groups would not effectively change a fire's rate of spread because of the small size of the groups (between .0.5 to 2 acres) and the distance between groups.

Comment #	Comment	Response
	maintenance required to maintain a shaded fuelbreak. Locating most group selection sites so as to serve a temporary dual role as SPLATs is not contrary to any of the Purpose and Need requirements of this project, nor prohibited by the HFQLG Act, yet could help reduce the possibly too-effective-wildfire-suppression result of proceeding with this project as now planned.	
29-7	We [...] asked for but did not receive a mapping of any areas over 1 acre or larger of late seral forest to be logged. Research indicates these are very important to the CSO. We do have limited information from previous projects showing seven habitat patches of 3G, 4N and or 4G strata greater than 80 acres. We think it is not a coincidence that some of these plots are within the "area thinning" acres or where there are many GS. There is also sections of contiguous late seral forest in the Northern part of the project where there are many GS planned. The area below Eagle Rocks in R5E, T27N is steep, roadless, full of big trees and absolutely beautiful. Punching GS throughout this area will not only be ugly, but will invite fire into the area by creating small brush fields surrounded by forest.	Vegetation typing used for the Creeks analysis is based on the Forest Vestra vegetation GIS coverage. Vegetation is generally mapped to polygons no less than 5 acres in size and is typed by CWHR size and density class. The term "seral stage" typically refers to an age class considered to be a stand development stage in a successional series. This type of classification was not used in the Creeks analysis. Chapter 3 (Silviculture Resources section) of the FEIS displays acres by strata proposed for treatment within DFPZ, Area Thin and Group Selections. Area Thin treatments were placed to strategically support the DFPZ network. Consideration was given to elements including position on the landscape, topography, access, and large tree and canopy retention requirements. Group selections were placed predominantly in CWHR 4M stands, which is the most prevalent strata in the project area. Large tree retention guidelines preclude installing groups in areas of trees greater than 30" dbh. Group selections are expected to be areas of less intense fire behavior due to fuels treatments.
29-38	Another concern of the Lassen Forest Preservation Group is what we see as a misrepresentation or mistakes on the ground of some of the CWHR sizes or categories. We have been scoping the Castle, Storrie, Creeks area for over 7 years and know the area well. There is simply NO NEED for more thinning for fuel reduction in parts of the project area, especially where there are large trees, in high elevations within valuable late seral habitat. The area near Humboldt summit in the C and B category DFPZ is high elevation red fir and already salvage logged and thinned in places. It is near a SOHA. The entire ridge above Shanghai Creek and much of Butt Creek is high elevation red/white fir. This contains the most contiguous late seral habitat in the project area and you plan to completely chop it up with thousands of acres of GS, thinning and DFPZs. There is already plenty of structural diversity up here with plantations, brush and large trees. You say the area thinnings are needed to "reinforce" the DFPZs and to protect the roadless areas and PACs. We say this project is designed for economic return for a few well-placed companies, to the detriment of the entire Sierra Nevada/Cascade ecosystem and citizens of California.	The Creeks proposed action includes approximately 14 acres of DFPZ near Humboldt summit that is prescription category "A". The next closest proposed thinning is DFPZ treatments near Butt Creek in the North East 1/4 of section 29, Township 27 North, Range 5 East, approximately one mile North of Humboldt Summit. It is unclear what the commenter is referring to as C and B category DFPZ near Humboldt Summit. Within the Shanghai and Butt Creek drainages, approximately 445 acres are proposed for Group Selection harvest and approximately 1,370 acres are proposed for DFPZ thinning. At the lowest reaches of Butt Creek there is approximately 190 acres proposed for Area Thin. These totals would not seem to equate to the "thousands" of acres referred to in the comment. DFPZ treatments are located along existing road systems as part of a strategic network and are areas that have been entered for management activities in the past. Group selections are proposed both within and outside of thinning areas. Groups are designed to create pockets of regeneration to develop uneven aged stands while retaining fairly continuous forest cover. While groups would increase stand heterogeneity, they represent a minor component (less than 20%) of individual stands. Stands that have group selections with no other proposed thinning treatments would retain stand structure predominantly as existing.

Comment #	Comment	Response
29-39	Photo of large trees on Road 307 within the planned DFPZ, B prescription.	We are unable to identify and confirm the treatment unit and assigned prescription from the photograph provided. The photograph appears to reflect a stand that would be classified as CWHR size class 5 based on the area shown in the photograph. Specific design criteria (Prescription C) apply to DFPZ units in stands of CWHR class 5M and greater.
29-42	Photo of Eagle Rocks as seen from Road 308. 18 group selections are planned here.	Group selections are proposed in the vicinity of Eagle Rocks. The 18 group selections referred to are proposed over approximately 700 acres on mid-slope and slope bottom positions on aspects ranging from northeast to northwest.
30-5	The DEIS p 68 discusses Area Thinning. There are 3 treatment types under "area thin" F, G, H. It may be an oversight but only under treatment "H" does the DEIS mention prescribed fire as a follow-up treatment p.69. It says Area Thin treatments will get prescribed burns post-thinning but they only say that under Treatment H. Does this mean some Area Thin treatments will not be burned and surface fuels will be lopped and scattered, increasing fire hazard? The residual fuels loads post-treatment based upon actual conditions that have been demonstrated to be operationally feasible, or based on clearly articulated assumptions, needs to be explicitly disclosed.	Prescribed burning is an intended follow-up treatment in all area thin stands where residual surface fuels are in excess of desired levels (5 tons/acre or less of down woody material less than 12 inches diameter). This has been clarified in the FEIS (Chapter 2).
30-6	Important fire hazard tradeoffs with fuelbreaks are not conveyed. The DFPZs will likely be at the 30% canopy cover levels in 4M,D stands. No evidence is provided that at 30% cover regeneration in the fuelbreaks will be sparse. Conditions for regeneration of combustible shrubs into sunny openings could be created. If the fuelbreaks are burned or cleared frequently, shrub invasion may be prevented. However, the DEIS does not guarantee maintenance of fuelbreaks, nor does it describe how management of surface fuels generated by harvests and follow up maintenance of surface fuels would be funded. It should be noted in the FEIS that there is historical precedent for fuelbreak abandonment in California due to insufficient funding (Davis 1965).	It is inferred that the commenter is referring to stands that would be CWHR density class P after DFPZ thinning, as by definition CWHR class 4M and D stands have canopy cover at or above 40% and 70%, respectively. Please refer to the discussion of DFPZ maintenance in Appendix A of the FEIS. Timing of DFPZ maintenance to address surface fuel accumulation (including vegetation growth) is projected based on post-treatment stand structure as described in Chapter 3 (Silvicultural Resources section) of the FEIS. This includes stands of initial post-treatment canopy closure of 30%. Research on vegetation growth in group selections indicate that growth is typically slow in small openings (less than one acre) because adjacent tree roots are capturing most of the available resources. In larger openings (between one and two acres) vegetation growth increases near the center of openings, but is suppressed nearer the edges within the rooting zone of border trees (McDonald and Fiddler, 1991). Observations of vegetation growth in plantations and thinned stands on the Almanor District support these findings. Vegetation growth within DFPZs are expected to exhibit similar results of suppressed growth rates within the rooting zones of overstory trees and scattered areas of more rapid vegetation growth in the centers of larger openings.
30-11	If plantations fail, chaparral can be expected to grow following clear cutting. Chaparral is highly combustible. Its dense, leathery leaved foliage has exceptionally low moisture content in late summer and fall, and is a receptive fuel due to its high surface to volume ratio, and chemistry (Rothermel and Philpot 1973, Odion and Davis 2000). The foliage contains far more high-energy chemical bonds than most vegetation, and there is consequently greater energy release per unit leaf area	Please refer to the purpose and need, Chapter 1 of the FEIS and all action alternatives (Chapter 2). Clearcutting and the establishment of plantations is not a component of the proposed action or any action alternative (FEIS, Chapter 2). Proposed thinning and group selections do not support the development of broad expanses of montane chaparral because, unlike clearcuts, the stands would still be dominated by residual trees after treatment.

Comment #	Comment	Response
	(Richards 1940, Rothermel and Philpot 1973). Many of these chemicals are volatized with little pre-heating, and the resulting vapors readily ignite. Although montane chaparral is less combustible than chamise chaparral of southern California, landscape scale assessments of fire severity have found that montane chaparral exhibited substantially greater fire severity than associated forest vegetation (Odion et al. 2004). There is literature detailing the self-reinforcing relationship montane chaparral vegetation has with fire in the Sierra (e.g. Show and Kotok 1924, Wilken 1967). Wilken (1967) describes a stand of chaparral that established following logging in the mid-1800's that has since been maintained at the expense of forest by its highly combustible nature. John Muir also provided vivid descriptions of crown fire in montane chaparral: "I met a great fire, and as fire is the master scourge and controller of the distribution of trees, I stopped to watch it...It came racing up the steep chaparral-covered slopes of the East Fork canyon with passionate enthusiasm in a broad cataract of flames, now bending down low to feed on the green bushes, devouring acres of them at a breath, now towering high in the air as if looking abroad to choose a way, then stooping to feed again." Muir went on to describe the fire burning into the crowns of large conifers, which can occur due to the great amount of heat generated by the shrubs and other surface fuel.	
30-13	There is a need to assess the long-term impacts to ecological integrity from the timber harvesting proposed in the Creeks project vs. no harvesting or use of fire alone as treatment. Ground based logging of overstory trees as proposed has numerous impacts described in a voluminous literature. These impacts include soil compaction and displacement, increased runoff and soil erosion, off site impacts to aquatic systems, damage to understory plants, effects of building, reopening and maintaining roads, exotic species spread, etc. There are impacts of future out of season burns (Show and Kotok 1924, Borchert and Odion 1995), and burning of slash piles (Korb et al. 2004) mentioned. It is beyond the scope of this letter to describe all these impacts. These effects and ecological ramifications have been extensively and repeatedly documented U.S. (e.g., Show and Kotok 1924, Issac and Hopkins 1937, Geppert et al., 1985; Halpern and Spies 1995, SNEP 1996, USFS and USBLM, 1997, Perry and Amaranthus 1997, Lindenmayer and Franklin 2002, Forman et al. 2003, etc.). It is the purpose of the EIS to adequately describe known impacts of proposed projects to allow for public understanding. The DEIS does not convey the potential for long-term degradation of ecological integrity.	Please refer to Chapter 3 of the FEIS for discussion of direct, indirect, and cumulative effects of action alternatives and the no action alternative.
30-16	The public would have a better understanding of the impacts of proposed fuelbreaks created by mechanical means if a picture of a recently completed Forest Service project. I found the picture below in Fremontia, which shows heavy soil disturbance that can promote exotic species and cause loss of native understory vegetation.	The picture from Fremontia is indicated to be of a DFPZ on the Lassen N.F. With the information provided by the commenter, we are unable to identify and verify the location or treatment depicted. Photographs are included in the FEIS depicting existing and desired condition classes (Chapter 3, Silvicultural Resources section), and recent thinning conducted on the Almanor Ranger District within the Creeks Project analysis area.

Comment #	Comment	Response
30-18	Fuelbreak construction and maintenance activities also have the potential to spread forest diseases such as sudden oak death. Sudden oak death is caused by a newly described pathogen, Phytophthora ramorum (Rizzo & Garbelotto 2003). Despite the common name for the disease, the pathogen has a wide host range that includes California black oak, Douglas-fir, madrone, and manzanita (Rizzo & Garbelotto 2003). Death or dieback of these plants may exacerbate fire severity and rate of spread. P. ramorum can spread in infected leaf, wood (sawdust), and soil particles in chainsaws, machinery, hand crews, etc. Long-unburned vegetation, as found in the Project area, is especially susceptible to the disease (Moritz and Odion 2004). Mid-elevations of the Sierra are generally considered one of the areas most at risk to the spread of the disease (Meentemeyer et al. 2004). P. ramorum has been recently distributed throughout the United States in nursery stock (Stokstad 2004). All of these factors suggest the logging and other activities can place Sierran forests at relatively high risk for the disease. These potential long-term impacts need to be addressed in the FEIS. Along with P. ramorum, two other Phytophthora species have now been isolated from trees showing similar symptoms, P. nemorosa (Hansen et al. 2003), and P. pseudosyringae. P. nemorosa is a newly described species, while P. pseudosyringae is known from Europe. These diseases provide additional incentive for measures preventing disease spread. Strategies for mitigating the spread of Phytophthora where human activities occur are imperfect, and the best way to prevent spread is the cessation of activities that are known to cause it (Hansen et al. 2000). Also meriting serious concern is the spread of exotic plants. Fuelbreaks share a number of characteristics with roads, which have been extensively linked with non-native plant invasion (Mooney & Hobbs 2000, Forman et al. 2000). In fact, fuelbreaks have themselves been likened to "invasive highways" (Keeley 2001). The proposed fuelbreaks would promote invasion by removing dominant competitors, opening forest canopies, disturbing soils, and changing hydrologic conditions (reviewed in Mooney and Hobbs 2000). Chronic maintenance, if undertaken, would perpetuate the problems of soil disturbance and the introduction of seed of alien species that take advantage of disturbance. Equipment used to construct fuelbreaks and for group selection logging may transport the seeds of invasive species into areas where they were not formerly present. The establishment of non-native invasives in fuel breaks may provide an exotic seed source in close proximity to intact wildland areas. These wildland areas may then be more susceptible to invasion, particularly following disturbances such as natural or prescribed fires (D'Antonio 2000). Exotic species spread in fuelbreaks needs to be disclosed as an unavoidable impact since it is not known to be preventable (see http://www.werc.usgs.gov/fire/seki/frm/). Of particular concern in the Sierra is the invasion of Scotch Broom, which has	The literature cited by the commenter (Moritz and Odion 2004) was not found to affirm or even discuss if long unburned vegetation was especially susceptible to the disease of sudden oak death. The literature cited (Moritz and Odion 2004) discusses the use of prescribed burning as a tool to manage the disease. The literature cited by the commenter (Meentemeyer et. Al. 2004) pertaining to risk of new infection of Phytophthora ramorum in the Mid-Elevations of the Sierra clearly shows much of Plumas County as well as the northern corners of Tehama and Butte Counties, including the project area, to be at very low risk of infection. The closest known occurrence of infection is in the coast range over 200 miles away according to Meentemeyer et al. (2004). The literature cited by the commenter (Stokstad 2004) pertaining to distribution of P. ramorum in nursery stock refers to commercial retail nurseries that handle host plant species. Conifer species proposed for reforestation (planting) in the Creeks Project are not known to be host species for P. ramorum. Based on current information as discussed in the citations above, the risk of introduction of P. ramorum as a result of proposed activities in the Creeks Project area is considered to be very low.

Comment #	Comment	Response
	severely degraded extensive areas by forming near-monocultures (Bossard et al. 2000). Seed of these brooms is spread readily by foot traffic and machinery (Swezy and Odion 1997). Once established, broom may be impossible to eliminate. Broom is further spread by fire (Odion and Haubensak 1997). The activities proposed in the Creeks Vegetation Mangement Project appear well-suited for spread and establishment of broom networks, from which the noxious weed can spread further. This could increase fire hazards due to the combustibility of broom (http://www.cdfa.ca.gov/phpps/ipc/ weedinfo/brooms.htm), much like the growth of chaparral does. In sum, the FEIS fails to disclose the potential for impacts from the preferred alternative that could result in severe and irreversible degradation of ecosystems via the promotion of alien species invasions.	
32-26	The project's canopy cover retention standards also appear inconsistent with the 2004 ROD. Within area thin units, the 2004 ROD requires that projects retain at least "50% canopy cover after treatment averaged within the treatment unit, except where site-specific project objectives cannot be met," when a 40% standard applies. (USDA Forest Service 2004a, p. 69). By comparison, the Creeks DEIS (p. 38) states that canopy cover "would be retained near 50% and would not be reduced below 40%" in such units. The DEIS fails to demonstrate that "site-specific objectives cannot be met" utilizing a 50 percent canopy cover retention standard, or to require such a showing within individual units. Moreover, a requirement of "near" 50% is impermissibly vague and does not comply with the 2004 ROD's 50% retention standard. The 2004 ROD also includes standards that limit the amount by which canopy cover can be reduced under different prescriptions. For example, in DFPZs within CWHR 5M, 5D, and 6, the Forest Service must "avoid reducing pre-treatment canopy cover by more than 30%." (USDA Forest Service 2004a, p. 68). A similar requirement applies to area thinning. (Ibid., p. 69). The Creeks project must comply with these requirements, yet based on our review of the proposed action we were unable to find any reference to them. Finally, the 2004 ROD also includes basal area retention standards for different prescriptions. (USDA Forest Service 2004a, pp. 68-69). Depending upon the timber strata type, these basal area retention standards can translate into upper diameter limits well below 30" dbh. (Verner et al. 1992, p. 23). Again, the Creeks proposed action does not appear to refer to these basal area retention standards, to specify how they will be applied in individual units, or to explain how the standards will translate into upper diameter limits that will protect medium and large trees. Given that most stands within the project area are "understocked with medium and larger sized trees" (DEIS, p. 86), it is particularly important that retention standards for larger trees be clearly articulated in the proposed action.	Area thinning prescription H is intended to reflect the range of canopy cover retention that would occur to achieve the stated objectives on a stand by stand basis. The statement that canopy cover would be "retained near 50%" is used to indicate that variation would occur on a stand by stand basis such that some stands may average exactly 50% canopy cover, whereas other stands would average slightly less or slightly more canopy cover. In order to achieve the objectives of breaking up live fuel continuity, reducing site competition as well as disease and decadence, and promoting structural diversity, stand canopy cover may be dropped to an average of 40% in some stands. In some cases, the above stated objectives may not be completely met in order to maintain a minimum average canopy closure of 40%. In those cases, the amount of fuel continuity or levels of retained disease and decadence in a stand would not be at desired levels but canopy closure would be retained at 40%. Please refer to Chapter 3 of the FEIS (Silvicultural Resources section). Stand basal area retention and levels of canopy cover reduction are described for each prescription in the FEIS. Proposed basal area and canopy cover retention levels are consistent with the 2004 SNFPA guidelines.

Comment #	Comment	Response
32-38	Canopy cover is an important element of old forest structure because species like the California spotted owl and American marten are closely associated with dense canopy cover. Moreover, relatively small differences in canopy cover are ecologically significant: for example, canopy cover of 40 percent is considered at best marginally suitable for owl foraging, whereas canopy cover of 50 percent or greater is widely considered to be suitable. (USDA Forest Service 200la, Vol. 3, Chapter 3, part 4.4, p. 73; USDA Forest Service 2004b, p. 275). Similarly, with respect to American marten on the adjacent Tahoe National Forest, the marten generally prefers canopy cover of 40-60%, while avoiding canopy cover of 30% or less. (Kucera 2005). Therefore, an accurate assessment of impacts on canopy cover is essential to an analysis of a project's likely impacts on old forest structure and associated species. The information in the Creeks DEIS with respect to the project's impacts on canopy cover is misleading and confusing. For example, with respect to canopy cover remaining within DFPZs, the DEIS is contradictory: the DEIS states that average canopy cover would be reduced to "near 40%" (pp. 64-65), "would generally average between 30-50%" (p. 34), and "would generally average between 40-50%" (p. 36). Similarly, with respect to canopy cover in the area thinning units, the DEIS states that canopy cover "would be retained near 50%" (p. 38), would average "near 45 percent" (p. 69), and would be "near 40%" (p. 68). As noted above, the difference between canopy cover of 30, 40, and 50 percent is ecologically significant; therefore, it is essential that the EIS include accurate and consistent information with respect to the project's impacts to canopy cover. Beyond that, the 2004 ROD requires that reductions in canopy cover be limited to 30 percent in certain prescriptions (USDA Forest Service 2004 a, pp 68-69), but the Creeks proposed action fails to refer to or incorporate this requirement. The information in the DEIS regarding canopy cover retention within RHCAs is particularly misleading. The DEIS analyzes the effects of the proposed action on stream condition based on the assumption that "RHCA prescriptions would retain trees larger than 30 inches and canopy cover would not be reduced below 40-50%." (DEIS, p. 165). However, the description of the alternative (Ibid., pp. 42-44) in no way limits the reduction of canopy cover throughout the RHCAs to 40-50%. Minimally, ground disturbance limitations are placed on the "inner zone" (i.e. 50 or 150 feet from the stream channel) of the RHCA with prescriptions C and H being applied. Prescriptions C and H maintain 40-50% canopy cover. The "outer zone" of the RHCA (i.e. the area between 50 feet and 100 feet from an ephemeral stream and 150 feet to 300 feet from a perennial stream) would be subject to "the appropriate DFPZ or area thinning prescription." (Ibid.). This means that portions of the RHCA that are located within DFPZs could be reduced to as little as 30% canopy cover.	Please refer to Chapter 3 of the FEIS for discussion of canopy cover levels and affects to habitats (Wildlife section).

Comment #	Comment	Response
	Such a result will have markedly different effects on microclimate, soil temperature and other environmental factors important to the riparian environment. Such effects were not disclosed in the DEIS.	
32-41	The DEIS fails accurately to disclose the effects of the Creeks project on medium-large trees (20-30" dbh). The DEIS discloses that the project will utilize a 30" dbh limit, but the 2004 ROD also imposes a requirement that 30-40 percent of existing basal area (depending upon prescription) be retained, "generally comprised of the largest trees." (USDA Forest Service 2004a, pp. 68-69). Depending upon existing stand structure, these basal area retention standards can translate into an effective diameter limit below 30". (Verner et al. 1992, p. 23). However, the DEIS fails to disclose the impact of the basal area retention standard on retention of medium and large trees. Medium-large trees, with diameters of 20-30", contribute significantly to habitat for old forest associated species like the California spotted owl and American marten (Kucera 2005; Blakesley 2005), and are generally understocked within the project area (DEIS, p. 86). Therefore, it is important that this information be disclosed and analyzed in the EIS.	Please refer to Chapter 3 of the FEIS (Silvicultural Resources section). Stand basal area retention and levels of canopy cover reduction are described for each prescription in the FEIS. Effects of proposed thinnings are displayed by acres of CWHR class which describes forest cover type, average canopy density class, and average diameter (dbh) class. As described in Chapter 3, stands would be thinned from below and larger fire resistant trees would be retained. Proposed basal area and canopy cover retention levels are consistent with the 2004 SNFPA guidelines.
Fire/Fuels/Air Quality		
1-8	All prescribed burning should be banned. fine particulate matter is spread by the smoke, which ends up all across the country causing lung cancer, heart attacks, strokes and asthma. I want the american lung association, the american heart association, the epidemiologists, the medical doctors, researchers in fine particulate matter and the clean air people called in on any projects which involve burning. burning needs to stop.	The comment request is beyond the scope of the Creeks FHRP FEIS and does not warrant further response. Please refer to the purpose and need of the Creeks FHRP FEIS (Chapter 1).
6-3	Fire prevention dollars should be put towards helping foothill and mountain communities become more fire safe. This is where the most serious fire danger lies.	Fire prevention funds are a subset of fire suppression dollars that are allocated to the Forest and Districts. Herger-Feinstein Quincy Library Group (HFQLG) dollars are used for hazardous fuels reduction projects. HFGLG projects, such as the Creeks FHRP, are designed to protect people, property, and natural resources from wildland fire.
11-15	To better educate the public reviewers of this document, it would help if you included the Condition Class 1, 2 and 3 Bitterroot National Forest photos that are promoted in the National Fire Plan and the Healthy Forest Restoration Act. Although the "Fire Regime" condition class table (Table 3-12) is informative, the public needs to see the actual overstocked conditions for CC1-3.	The FEIS (Chapter 3, Fire and Fuels section) contains photos taken within the project area that show representative stands in Condition Classes 1, 2 and 3.
11-17	I commend the individual that placed the first sentence at the top of page 89. The whole concept and purpose for DFPZ's is summarized in this sentence and I urge you to re-emphasize this point throughout this and other EIS's. This is another reason why a 40% crown closure floor target is needed as a standard for DFPZ's and area wide thinning projects. The only reason you should move under the 40% crown closure is when the fire folks can prove that a lower crown closure provides better	Thank you for your comment.

Comment #	Comment	Response
	protection benefits to forests, owls and fire suppression personnel.	
11-7	In the third paragraph on page 25, you suggest that surface and ladder fuels are removed in DPFZ's to prevent the initiation of crown fires when in reality, DFPZ's are being constructed to bring "oncoming" crown fires to the ground and give fire suppression folks a safe location to initiate activities. It was always understood that reduction of surface and ladder fuels within the DFPZ would prevent a crown fire initiation. The important point is for clarification on the intent and purpose of DFPZ's.	The commenter is correct. DFPZs are constructed to slow the intensity, lower the flame length, and slow the rate of spread of wildland fire from an outside point source when moving into the DFPZ.
17-20	DFPZ and Thinning The primary goal of DFPZ construction is to reduce the size of wildfires and provide fire suppression personnel safe locations for taking action. Reducing surface fuels will limit the intensity of fires, provide a higher probability of controlling wildfires, and allow more of the forest to survive when it does burn. The plan does not place enough emphasis on surface fuels. Instead it concentrates on ladder and crown fuels and this is a mistake. While surface fuels may be initially reduced, the opening of the canopy will result in rapid shrub response. According to the Creeks DEIS page 135 "DFPZs and thins of a similar prescription have been field reviewed several years after completion and very little ground vegetation has developed." While this may be true in some of the thinnings that have left a higher than prescribed canopy closure, north slopes or areas with no shrub seed bank, it is not true in many areas within the Creeks area.	We agree that there are previously treated stands within the analysis area where brush has responded following treatment. These previous treatments include older clearcuts, seed tree shelterwood harvests, and younger plantations. The thinnings that are proposed in the Creeks Project area are intended to have a higher canopy closure then the other treatments, and consequently are not expected to have the same response as the other treatments, and this is clearly discussed in Chapter 3 of the Creeks Project FEIS in the Silvicultural Resource section.
17-28	Since the primary public relations justification for this project is to relieve the hazard of catastrophic forest fires the Forest Service should make the scientific justification for the proposed prescriptions crystal clear. Fire behavior models for the less intensive timber harvest alternatives (especially alternative 3&4) should be revealed to the public to help us analyze the effectiveness of fuel treatments. Robin Bryant said that these alternatives were not analyzed in detail (personal communication). If there has been any fire behavior analysis of the effectiveness of 12"-20" upper diameter harvest limits (UDLs) it should be included in the public record for this project.	Since Alternatives 3 and 4 were not chosen for detailed analysis, no fire behavior modeling was done on them. Please refer to Chapter 2 of the Creeks Project FEIS for alternatives considered but eliminated from detail analysis.
17-29	Crownfires in this area are usually associated with surface fuel accumulations that ignite ladder fuels into crownfuels. Crownfires that burn independently of surface fuels require a quantifiable high crown bulk density (CBD). The fuels report for this project contains specific CBD data that could be used to target the few stands that may approach such high CBD. But the DFPZ/thinning prescription is applied throughout the landscape without reference to this data. The widespread canopy thinning is likely to result in shrub response, adding to surface fuel accumulations that will be troublesome in the years to come.	Crown bulk density is defined as the amount of available canopy fuel per unit canopy volume. Crown bulk density is the average mass (kg/m3) of tree crowns across a forest stand (Brown and Smith, 2000). It is a bulk property of a stand, not an individual tree, and is represented as the available canopy fuel load divided by canopy depth (Scott and Reinhardt, 2001). Thinning to reduce crown bulk density to less than 0.10 kg/m^3 generally recommended to minimize crown fire hazard when a fire moves into an area from an outside point source (Agee, 1996). For any given species, more widely spaced trees have a lower canopy bulk density, which makes it

Comment #	Comment	Response
		more difficult to maintain crown fires. CBD across the project area currently ranges between 0.11 to 0.30 kg/m^3 in the analyzed CWHR classes (FEIS, Chapter 3, Fire and Fuels section). This range is considered as moderate to high in hazard as masses range above 0.10 kg/m^3.
17-5	I am concerned that the activity fuel prescription for GSs on slopes >35% will promote high intensity wildfire. Hand thinning, bucking and piling or scattering of the treated fuels, rather than whole tree yarding and complete removal, is likely to exacerbate extreme fire behavior.	Whole tree yarding would be used on slopes greater than 35% where economical. Additional fuels reduction treatments would be applied post harvest as described in the alternatives in Chapter 2 of the Creeks Project FEIS.
17-6	Surface fuel reduction must be the central objective of treatments designed to reduce fire intensity. This plan does not place enough emphasis on surface fuels. Dr. Scott Stephens statement to the US House of Representatives, Resources Subcommittee on Forests and Forest Health field hearing on the Sierra Nevada Forest Plan on 2/28/04 described the fire behavior of the Cone Fire on Blacks Mountain in LNF. The units that left additional activity fuels (lop and scattered) burned as high intensity surface fires that killed 60-80% of the residual trees in a thinned stand. I am concerned that the GSs that contain lopped waste materials will not be able to survive uncontrolled wildfire burns.	Fuel reduction treatments would occur both during harvest activities through whole tree yarding when economical, and during post harvest fuel treatments as described in Chapter 2 of the Creeks Project FEIS.
18-3	Fire control must start with thinning in areas adjacent to towns/cities and developed areas.	We agree with this comment. We placed our highest priority on fuels reduction treatments adjacent to communities at risk. The large majority of this work on the Almanor Ranger District of the Lassen National Forest was accomplished with projects implemented in the years 2003-2005.
19-5	Group selections would remove 893 acres of suitable spotted owl foraging habitat and create local areas with increased risk of fire in the short term. Embedding group selection units within thinned areas of forest would decrease the effectiveness of the thinned areas as fuel breaks (Odian et al. 2004), while simultaneously removing suitable spotted owl habitat.	On of the main objectives of our post harvest site preparation activities within group selection areas are to reduce both pre and post harvest related fuels. The method of treating those fuels is discussed in Chapter 2 of the Creeks Project FEIS. The effects of group selections on fire behavior are discussed in Chapter 3 of the Creeks Project FEIS. The effects of group selections to spotted owl habitat are disclosed in Chapter 3 of the Creeks Project FEIS (Wildlife section).
23-12	In addition to the proliferation of vegetation, the project area will experience reduced surface fuel moisture and increased flammability (Countryman 1955 as cited in Weatherspoon 1996). The greater the stand opening, the more pronounced the change in microclimate is likely to be. Increased ladder fuels and decreased surface fuel moisture can be a catastrophic combination. These effects must be analyzed within the EIS.	One of the objectives of the Creeks Project is to reduce ladder fuels within treated stands. The effects of fuel reduction treatments are discussed in Chapter 3 of the Creeks Project FEIS within the Fire and Fuels section.
23-13	There is no questioning that the existing conditions and fuel levels of the project area need to be mechanically treated prior to the implementation of any fire and/or fire surrogate maintenance strategies. Abundant surface and ladder fuels, and dense stands pose a high risk for any prescribed burning efforts. However, studies have shown that following the mechanical treatment, underburning every 5-8 years is	Please refer to the Creeks Project FEIS (Appendix A) for a discussion of DFPZ maintenance. No herbicide use is planned for maintenance in the project area.

Comment #	Comment	Response
	required to stabilize the system in order to reintroduce any type of natural fire regime (Stephens 1998). Studies have shown that fuel breaks alone will not halt the spread of wildfire. Consistent prescribed burning has shown to be the most effective treatment for reducing a fire's rate of spread, fireline intensity, flame length, and heat per unit of area (van Wagtendonk 1996). The implementation of the currently designed DFPZs will ultimately fail due to their excessive harvesting prescription promoting the proliferation of surface and ladder fuels, the reduction in surface fuel moisture resulting from increased insolation, and the lack of landscape scale prescribed burning, or alternative fire surrogate strategies, used in combination with the fuel breaks. We feel that by implementing this project, the Forest will fail to accomplish their purpose and need and will only introduce a precedent for future actions based on a landscape that will require extensive future management likely to include the use of herbicides.	
23-15	While the Forest has made vague reference to reintroducing a natural fire regime, a demonstrated commitment to that goal needs to be discussed and proposed within this project. The courts have ruled that maintenance is an inherent part of DFPZ and QLG projects. The Forest needs to discuss, outline, and commit to specific steps towards reintroducing fire, utilizing goats, hand pruning and/or plans for future non-intrusive, non-herbicide management of fuels within the DFPZ that mimic historic natural cycles and conditions. We would also like the Forest to make a strong commitment to not use herbicides in this project or any subsequent projects that arise due to the actions proposed here. That commitment would entail the inclusion of language in the resulting NEPA documentation stating exactly that was just described above. Otherwise, we are to assume that no awareness for the long-term impacts of these actions was exercised and that the Forest has not adequately evaluated the scope of the project. Dr. Steven Radosevich, a professor at the College of Forestry at Oregon State University and a federal court-recognized vegetation management specialist provided expert declaration in support of our DFPZ maintenance arguments during litigation over the HFQLG FRA. In response to the Forest's reluctance to include DFPZ maintenance strategies, Dr. Radosevich has reviewed papers used by the Forest to determine and ultimately lengthen the timeframe for DFPZ maintenance. He has provided CATs a report outlining his expert interpretation of these papers. I have included a copy of this report in our comment package. A summary of his comments follow: Three papers by Alan Taylor determine that average historical fire-return levels for	Please refer to the Creeks Project FEIS (Appendix A) for a discussion of DFPZ maintenance. No herbicide use is planned for maintenance in the project area.

Comment #	Comment	Response
	low to mid elevation forests are 5-11 years and indicate that some form of fuel maintenance should be implemented every 2-5 years in order to maintain the efficacy of DFPZs. In addition, Taylor and his associates demonstrate a strong correlation between fire return frequency and elevation. Obviously moisture, temperature, and forest type are a direct function of elevation. The proposed action makes no mention of using elevation as a determiner of DFPZ design or maintenance despite the Forest's use and reference of these very same papers by Taylor for the purpose of DFPZ design and maintenance. The Forest should base DFPZ design on site-specific characteristics, as opposed to programmatic recommendations. In addition, the Forest must provide an accurate estimate of an anticipated site-specific DFPZ maintenance plan that will ensure the long-term efficacy of the DFPZ. Upon review of two papers by James Agee, Dr. Radosevich reiterates observations made by Agee on the benefits of maintaining a shrub layer and considering shrub structure and occurrence when designing DFPZs. Shrubs often provide a dampening effect to due their high moisture content. In addition, sites that lack a shrub layer, such as those following harvesting treatments, are typically dominated by seasonal grasses and forbs that provide a highly combustible fuel medium following their summer die-off. The Forest provides no evidence of considering shrub ecological factors in their design of the DFPZ for this project. Dr. Radosevich also reiterates the importance of considering elevation, as it will determine the shrub communities of a site and therefore its fire characteristics. The Agee articles reinforce the consideration of elevation by indicating that the highest management priority should be on fireproofing the low- and mid-intensity fire regimes (typically those found at lower elevations), since high intensity fire regime forests burn so infrequently anyway. It is obvious that initially, the DFPZ will successfully serve as a safe anchor point for suppression efforts, but over time, as a result of the excessive DFPZ design and lack of maintenance, an increase in both annual forbs and grasses, which will contribute to surface fuels, and the in-growth of smaller trees, contributing to ladder fuels, the DFPZ is highly likely to become extremely ineffective and potentially pose a greater fire hazard than the surrounding untreated stands. At the very least, it will no longer serve as an effective anchor point. Monitoring As Part of Maintenance Plans In July 2004, for another DFPZ project, CATs Executive Director Patty Clary and Plumas National Forest Supervisor James Pena reached an agreement (Appeal Resolution Agreement, Californians for Alternative to Toxics Appeal #04-05-00-0148-A215) regarding Meadow Valley DFPZ maintenance and monitoring in the Mt. Hough	

Comment #	Comment	Response
	Ranger District. It was agreed that upon completion of the DFPZ a schedule of monitoring would be conducted to evaluate fuel conditions within the DFPZ to ensure effectiveness. The object being to maintain surface fuels (fuels 0 – 3 inches diameter, including fallen vegetation from brush and trees) at levels below fives tons per acre and prevent dense ladder fuel accumulations. Monitoring will begin no later than four years post DFPZ construction, and continue no less than every two years thereafter. Results will be made public via the Forest's website and through timely mailing of notifications. Prescribed fire will be the preferred and priority treatment method to retain DFPZ effectiveness and reduce noxious weed invasion and surface fuel levels. The intention is to avoid herbicide use in DFPZ maintenance activities (language included in the signed agreement). DFPZ maintenance activities will be scheduled to insure fuel conditions are at desired levels and herbicides would not be needed. The intent is to take action with prescribed fire when surface fuel conditions reach levels of 5 to 7 tons per acre, and reduce accumulated fuels to levels less than 5 tons per acre. CATs hopes the Almanor Ranger District and Lassen National Forest will adopt and include similar monitoring and maintenance plans as part of this DFPZ project, if not all such activities. By following this example, the Forest will be setting a prestigious precedent, providing leadership for all National Forests of effective DFPZ forest planning.	
25-3	Air Quality Impacts The DEIS indicates that the project area lies within both the Northern Sierra Air Quality Management District (AQMD) and the Butte County AQMD, and that a smoke management plan would be submitted to and approved by the involved agencies prior to any burning in the Creeks Project area. It indicates that several communities are proximate to the areas where pile and prescribed burning is proposed to occur, and that by adhering to an approved smoke management plan, particulate matter emissions from pile or understory burning would not violate California Ambient Air Quality emission standards. The DEIS does not address existing air quality conditions, anticipated emission levels, locations of the referenced communities, local weather patterns, and additional information to support the assertion of compliance with all applicable air regulations. The document also does not discuss potential health impacts to sensitive populations (i.e., sensitive receptors located at schools, medical centers, retirement complexes, etc.) that may exist in the affected communities. Recommendation: The FEIS should provide information on existing air quality conditions in the project area, airshed and prevailing wind directions throughout the year, and a description of	The description of the alternatives (FEIS, Chapter 2) states that all prescribed fire implementation would follow specific Burn Plans that meet Region 5 standards and guidelines, and regional Air Quality Management District regulations. The Creeks FHRP Burn Plan, which would include the smoke management plan, would be developed prior to prescribed fire implementation. The plan would include a public notice process, anticipated emissions levels for fine particulate matter, and mitigation measures. This plan would undergo review and approval from both the Lassen National Forest Fire Management Officer and the Forest Supervisor. The Burn Plan includes a Smoke Management Plan, which must be approved by appropriate local air quality management district.

Comment #	Comment	Response
	modeling results that specify anticipated emission rates under the alternates, including the large wildfire burns anticipated under the no-action alternative. Federal National Ambient Air Quality Standards (NAAQS) should be discussed, and compliance with NAAQS and state standards should be evaluated under both alternatives. Information should be provided on the potentially effected communities, their locations, and sensitive populations that may be impacted. Major components of the smoke management plan should be described, especially the public notice component of the plan, and mitigation measures proposed as necessary. The FEIS should estimate improvements to air quality through the application of mitigation measures.	
27-1	Please analyze the following studies, which found that severe fire could be prevented with an 8-10" dbh limit, and please acknowledge that the science indicates that severe fire can be effectively mitigated by felling only very small trees, followed by prescribed burning or mastication, or explain in detail why these studies do not apply: Perry, D.A., et al. 2004. Forest Structure and Fire Susceptibility in Volcanic Landscapes of the Eastern High Cascades, Oregon. Conservation Biology 18: 913-926 (crown fire potential prevented--even under the most extreme conditions--through thinning of trees less than 20 cm dbh (8 inches dbh) and subsequent controlled burning of slash). Omi, P.N., and E.J. Martinson. 2002. Effects of fuels treatment on wildfire severity. Final report. Joint Fire Science Program Governing Board, Western Forest Fire Research Center, Colorado State University, Fort Collins, CO. Available from http://www.cnr.colostate.edu/frws/research/westfire/finalreport.pdf . (found that precommercial thinning of trees under 8 to 10 inches in diameter reduced potential for severe fire (email communication with the authors confirmed that trees removed were of this small size class)). More specifically, on page 921 of Perry et al. (2004), it is stated that, for three of the plots, there was approximately 20 square meters per hectare (about 87 square feet per acre) in trees over 55-60 cm dbh (i.e., over 22-24 inches in diameter). This equates to about 27 trees per acre 24 inches in diameter in these three plots. Even if basal area in trees over 55-60 cm dbh was somewhat smaller, say 75 square feet per acre, this would still equate to at least 18-22 trees per acre 24 inches in diameter or larger, conservatively estimated. The Creeks project does not generally have a significantly greater density of trees >24 inches dbh than this. Perry et al. (2004) found that, on ALL fourteen plots (including the three plots described above), "thinning trees of <20 cm dbh [8 inches dbh], coupled with controlled burning to reduce logging slash, would prevent torching (fire moving from the ground into the	The DFPZ and area thinning proposed in the Creeks Project FEIS (Chapter 2) have site specific thinning prescriptions that were developed by the District silviculturist and fuels officer to meet the purpose and need for DFPZs and area thinning as described in Chapter 1 of the FEIS. The effects of these prescriptions are discussed in Chapter 3 of the FEIS. Both specialists used their knowledge and expertise, and appropriate research (see Chapter 3, Silvicultural Resources, and Fire and Fuels section, as well as Chapter 5, Cited References) in developing these site-specific prescriptions.

Comment #	Comment	Response
	crowns) on all plots, even under extreme fire conditions (low fuel moisture and 80-kph winds)". Why is it necessary to remove trees 30" dbh on the project DFPZs in order to reduce severe fire potential, in light of this? Similarly, the Omi and Martinson (2002) study, found that precommercial thinning reduced stand damage (a measure of fire severity generally related to stand mortality) in both of the two thinned study sites, Cerro Grande and Hi Meadow (the authors reported that the Hi Meadow site was marginally significant, p<.1, perhaps due to small sample size), each with several plots.	
27-2	The DEIS states that the 30-inch diameter limit alternative is the most effective in preventing severe crown fire, citing a modeling article by Scott and Reinhardt (2001) on crown bulk density and canopy fuel load. Omi and Martinson (2002) found that crown bulk density was not strongly correlated to fire severity in actual fires. Rather, height to live crown, which pertains mainly to very small trees (since larger trees have higher crowns), was found to be strongly correlated to severity. How do you respond to this? Also, where is your hard data to support the validity of your models with regard to the importance of reducing crown bulk density and canopy fuel load in order to reduce incidence of severe fire?	Crown base height, as well as crown bulk density, are analyzed and discussed in Chapter 3 of the Creeks Project FEIS (Fire and Fuels section).
27-3	The DEIS states that the 30-inch limit performs better than lower dbh limits in terms of reducing crowning and fire severity. Could you please indicate, explicitly, how you deal with mid-flame windspeeds in this regard? Specifically, as canopy cover is decreased, mid-flame windspeeds increase, due to a reduced buffering effect. As mid-flame windspeeds (20 ft.) increase, so too does rate of spread, which corresponds to a higher fireline intensity and, in turn, larger flame lengths, leading to higher fire severity (Rothermel 1983, 1991). It seems that you may have excluded this effect in your model. Please explain whether this is true, and what your rationale was for excluding such a factor—one which does not lead to the conclusion that greater reductions in canopy cover lead to greater prevention of severe fire? Please explain this, in particular, with respect to the torching index and crowning index model outputs.	A correction to this comment is that mid-flame and 20 foot wind speeds are separate variables, but one can be converted from another for fire behavior model input. The wind speed reduction factor is used to convert the 20-foot wind speed to the mid-flame wind speed. Under modeling conditions in a closed canopy, the wind speed reduction factor is typically 0.2, and open or thinned canopy is 0.3, and completely unsheltered fuels is 0.4 (Rothermel, 1983). The fire modeling used for the Creeks Project (FEIS, Chapter 3, Fire and Fuels section) adjusted wind speeds using these factors which were directly input into the Fuels Management Analyst (FMAPlus) fire modeling software. FMAPlus converts 20 foot wind speeds to mid-flame wind speed.
27-4	The DEIS fails to include a reasonable range of alternatives among the alternatives given "detailed study". An alternative with a 20" dbh limit outside of Defense Zones, and requiring annual piling and burning of slash, and no removal of fire-resistant ponderosa pine (at least those >15" dbh, given your stated purpose of increasing such trees) should have been given detailed and full consideration, equal to the proposed action—and including full modeling outputs in the Fire/Fuels section so results can be compared.	CFR regulations (1502.14) call for a range of reasonable alternatives, not a "reasonable range of alternatives". Based on public comment, new alternatives have been included in the Creeks Project FEIS (Chapter 2).
27-5	Stephens and Moghaddas (2005) ("Silvicultural and reserve impacts on potential fire behavior and forest conservation: Twenty-five years of experience from Sierra Nevada mixed conifer forests" (in press—a copy can be obtained from Jason	The commenter is not correct: the Creeks Project is not an overstory removal project, nor does it include overstory removal in any of the prescriptions (FEIS, Chapter 2). The Creeks Project FEIS (Chapter 2) clearly states that the DFPZ and area thinning

Comment #	Comment	Response
	Moghaddas in Plumas N.F. headquarters)), found that thinning from below resulted in LOWER mortality rates in subsequent fire as compared to overstory removal. The thinning from below treatment in that study (which was co-authored by the author of the Empire project (Plumas N.F.) Fire and Fuels Report) resulted in a post-treatment canopy cover of 57% and basal area of 48 square meters per hectare (approximately 210 square feet of basal area per acre). The study was conducted in forest type and structure similar to that of this project. The post-treatment canopy cover and basal area for the thin from below treatment was much higher than that proposed for the Creeks project. Also, Table 7 from the study shows that mortality levels for the thin from below treatment were projected to be very low for trees over 20" dbh, even at 97.5% fire weather. Please explain why canopy cover and basal area equivalent to the thin from below post-treatment in Stephens and Moghaddas (2005) could not be retained in the Creeks Project.	prescriptions are thin from below treatments. The Fire and Fuels section of the FEIS (Chapter 3) discusses the environmental affects of the alternatives, and are directly tied to site-specific analysis of the project area.
27-8	The DEIS does not adequately analyze the potential impact of slash debris in terms of fire hazard to nearby communities between when logging occurs and slash debris is reduced through piling and burning and/or underburning. This is a serious potential risk to public health and safety, as well as a significant unknown risk, and must be fully analyzed in detail. Please provide detailed and specific answers to ALL of the following questions: a) What is the expected lag time between logging and completion of slash burning?; b) What is the maximum potential lag time between logging and completion of slash burning?; c) How many tons per acre of slash debris, in addition to current surface fuels, will be created in both DFPZ and group selection units (please be specific) after logging (and before slash piling/burning)?; d) What would be the effects, in terms of the fire behavior model outputs in the Fire and Fuels Report, if a fire occurred in the slash debris before slash piling and burning occurred (i.e., for this scenario, please present specific model outputs like those currently shown in the Fire and Fuels Report—such outputs are currently missing)?; and e) what is the additional fire risk and effects to communities, and to the forest, from this slash debris if a fire occurs before slash is piled and burned (assuming that this ever occurs)?	Question a: Based on our experience, the minimum expected time between the creation of residual harvest slash, and its removal by pile burning or underburning is approximately six months to two years. Slash created during the late spring can be burned the following winter or spring. Typically slash that is created in the summer or late fall must go through an additional summer of drying in order to allow efficient, clean combustion. Clean combustion is essential to protect air quality and to achieve desired consumption. Question b: Based on our experience, three to four years may elapse before all burning may be completed. Question c: The amount of fuels post-logging and before completed fuels treatments is unknown. The desired fuel loading post-project would be no more than 5 tons per acre of slash debris (0.1 - 3.0" diameter), and 10 to 15 tons per acre of larger diameter material (3.0" and above) (FEIS, Chapter 2). Question d: The fire behavior modeling presented in Chapter 3 of the Creeks Project FEIS discusses anticipated results for each of the alternatives considered in detail. Modeling was not done for the period of time post harvest and prior to the completion of fuel treatment activities. However, anticipated fuel loadings (both ground and aerial fuels) for Alternatives 1 and 14 is less than what is expected under the no action alternative. Question e: It is anticipated that fuel conditions post-harvest would vary throughout the project area, with areas needing relatively little additional fuels treatments, and areas needing fuel reduction treatments as described in the Creeks Project FEIS (Chapter 2). Fuel loadings would be reduced through the development of DFPZs and area thinnings, and thus it is anticipated that fire hazards would be less than what is expected under the no action alternative.
27-9	Which trees, if any, will be whole-tree yarded? Will all trees under 20" dbh in BOTH group selection and DFPZs be whole-tree yarded? For trees 20-30" dbh, will any	Trees between approximately 3" and 20" dbh would be whole tree yarded from both the DFPZs, Area Thinnings and Group Selections within the DFPZ or Area Thinning.

Comment #	Comment	Response
	portion of the trees be whole-tree yarded in both group selects and DFPZs? If so, which portion? Also, if the butt log (41' long) of trees 20-30" dbh is to be limbed in the units, how much slash will be created by this (tonnage), including live and dead limbs? What portion of the limbs, and total tonnage of limbs, are expected to break off when trees <20" dbh and 20-30" dbh are felled and dragged to the landing?	Trees larger than 20" dbh would be bucked at approximately 41 feet, and the remainder (top of the tree) would be yarded whole to the landing. In DFPZ and Area Thinnings there would be approximately 3 trees per acre between 20 and 30" dbh removed (refer to Chapter 3, Silvicultural Resources effects section of the FEIS). For trees less than 20" dbh limb breakage is expected to be consistent with what has occurred on other similar projects in adjacent areas. Excess slash would be disposed of as described in the description of the treatments in Chapter 2 of the FEIS. Similar methods would be applied in tractor and cable Group Selections. In helicopter Group Selections, the top of the trees would be yarded with the top log.
28-3	I would [...] like to see a realistic estimate, given current Air Quality Management Guidelines, of the percentage of each project area the Forest Service estimates it will be able to burn, within the next 10 years, as essential follow-up to effective DFPZ creation and once those "control lines" for broadcast burning or backburns are established forest wide.	The comment is outside the scope of the Creeks Project FEIS analysis.
28-4	The Creeks EIS states that the forested stands within the Creeks project area are now predominantly in Condition Classes 2 & 3, with 75% of the proposed treatment area containing high surface fuel loading. I am concerned that by creating so many miles of DFPZs, the primary purpose of which is for safer and faster staging of wildfire suppression personnel, the Forest Service will be greatly increasing the major cause of those hazardous existing conditions, which occur mainly because of so many years of over-zealous fire suppression. In other words, I worry that the HFQLG Act mandated DFPZ network will mainly serve to exacerbate the historic trend toward longer fire intervals, forest wide, rather that act to bring the forest back to a safer, less fuel-dense condition.	We disagree with the comment. The alternatives for the Creeks Project are designed to meet the Purpose and Need as described in Chapter 1 of the Creeks Project FEIS.
29-40	On Road 307 starting at Humbug summit, then continuing SE on Rd. 26N31 a DFPZ is planned. This area is high elevation, big beautiful red fir, much of which was part of the carnivore habitat management area corridor. A SOHA is adjacent to the 26N31 road. Road 307 is an area of "high interest in visual quality and designated as part of the Back Country Discovery Trail". Most of this DFPZ has been salvage logged and thinned previously. Some of the area is in the B DFPZ category and it should definitely be in C category. There can be no fuel reduction justification shown here to degrade this valuable habitat. The project plan appears to place GS, area thins and DFPZs in areas with the most economic return with unfortunately the greatest environmental harm.	Thank you for your opinion regarding the appropriate locations for DFPZ construction. The Responsible Official would take into consideration all the effects from the alternatives at the time of the decision. The placement of Group Selections was designed using the strategy outlined in the HFQLG FEIS and ROD (1999). Group Selections are located in CWHR size class 4 (medium sized trees, 11" to 24" dbh). Stands comprised primarily of either larger trees (CWHR size class 5, >24" dbh) or smaller trees (CWHR size class 2, 6" to 11" dbh) were avoided. CWHR size class 5 was avoided because these stands contain a large proportion of trees larger than 30" dbh which would need to be retained and therefore would not meet the objectives of the group selection prescription. CWHR size class 2 was avoided because it does not make sense to place group selections in young stands of trees, nor would it meet the purpose and need for this project.
30-2	On page 81, Table 3-11 shows fires by size class from 1911-2002. It identifies 26,980 acres of fire over 500 acres in size, and 857 acres of fire 100-499 acres. The table tells us nothing regarding the severity or environmental harm associated with those fires and potentially misleads the reader into thinking that those (28,314 total	See also response to comment 30-15. The Storrie Fire (August and September, 2000) located to the south of and adjacent to the Creeks Project area demonstrated how fire would likely behave in vegetation

Comment #	Comment	Response
	acres of fire in a 32,570 acre project area) were environmentally harmful. Proper NEPA disclosure should discuss the effects of those fires, when known, and some discussion of recovery. These fire effects should be contrasted with mortality and impacts of silvicultural treatments followed by fire. The Storrie Fire provides evidence for how fire may be expected to behave in long-unburned forests of the region not managed for timber production. This fire produced ecologically beneficial fire effects. In contrast, fires such as the Freds [sic] and Power Fires on the Eldorado National Forest, which burned through plantations and other silviculturally managed areas were more severe, and they compounded damage caused by logging. The FEIS should place the silvicultural activities proposed in their proper context by stating a particularly important conclusion in the Sierra Nevada Ecosystem Report. The Report pointed out that there is scientific consensus that silvicultural activities have increased potential fire severity more than any other recent human activities in the Sierra (SNEP 1996). The citation to Omi and Martinson (2002) on page 86: "stands with prior fuel treatments experienced lowered fire severity than untreated stands" fails to mention that the trees which were thinned in the review of 4 recent fires in the U.S. were presumed to be less than 8"-10" dbh. This fact should have been disclosed. Fire modeling in the peer-reviewed literature has found that silvicultural activities that open forest canopy increase fire hazards in Sierran Forests like those of the Creeks Project area (Stephens and Moghaddas (2005a). Stephens and Moghaddas (2005b) also found that fire only treatments preformed better than mechanical only and as well as mechanical w/fire in terms of fire behavior and tree mortality.	types similar to Creeks area under severe fire weather conditions. The vegetation communities in the Storrie Fire were similar in stand structure and species composition as Creeks. Some of these vegetation communities burned at moderate and high intensities, with entire stands of trees killed as a direct result of fire-related injuries. An assumption is made that a fire in the Creeks Project area under current conditions and similar weather would experience moderate to high intensity fire. No records of fire effects from large fires in the Creeks Project area could be located that occurred earlier in the 20th century. However, based on local experience and the expertise of our resources specialists, and analysis of more recent fires (such as the Storrie Fire), the affects of wildland fire in vegetative and fuel conditions as found in the Creeks Project area can be reasonably predicted (FEIS, Chapter 3, Fire and Fuels section).
30-3	A number of additional findings from this particularly relevant study [Stephens and Moghaddas, 2005 a] need to be addressed in the Creeks DEIS analysis: • Reducing crown bulk density with crown thinning alone did not substantially change potential fire behavior or effects. The most effective method for crown fuels reduction is the removal of 2.5 cm -25 cm diameter class. • Prescribed burning was effective in reducing tree density in the 2.5 cm-25-cm DBH class but there was not a corresponding reduction in crown bulk density. Even though crown bulk density was not significantly reduced in the fire only treatments, predicted fire behavior and mortality were more effectively reduced relative to controls and mechanically only treatments. This is likely due to the reduction in surface fuels, which in turn reduced flame length and fireline intensity, resulting in a decreased probability of crown fore and tree mortality. • Canopy cover was reduced in all active treatments through it remained relative high (51%-65%) in units treated mechanically. • Prescribed burning significantly reduced the total combined fuel loads of litter, duff, 1,10, 100, and 1,000-hour fuels as much as 90% (Table 8) in fire only and mechanical plus fire treatments. This reduction significantly altered fire behavior in	Crown base height, as well as crown bulk density, are analyzed and discussed in Chapter 3 of the Creeks Project FEIS (Fire and Fuels section). The SNFPA ROD (2004) addressed the need to apply site-specific fuel reduction treatments, and increase the flexibility for Forests to implement those treatments. Prescribed fire is one of the tools used to implement fuel reduction treatments, however, the ROD also recognized that mechanical treatments may be needed prior to prescribed burning. The Creeks Project FEIS (Chapter 3) discloses the effects of implementing the alternatives considered in detail, including the effects of no action.

Comment #	Comment	Response
	both mechanical plus fire and fire only treatments in terms of fireline intensity and predicted mortality. • Prescribed burning was more effective at reducing fire behavior in terms of fireline intensity, flame length, and rate of spread at 90th percentile conditions. • Treatments that utilize fire as the primary treatment (fire only) or secondarily after mechanical treatments (mechanical plus fire) had the lowest predicted probability of mortality under the three modeled weather conditions (Table 11). Even under the most severe modeled conditions, the probability of tree mortality in burned treatments remained relative low.	
30-4	The DEIS on p. 86 mentions crown fire initiation and spread but fails to recognize that about 0.037 kg/m3 canopy bulk density is required for propagating fire (Scott and Reinhart 2001). Crown base height was defined in the DEIS as the lowest height above which at least a minimum of 0.01 kg/m3 of live and dead branches are present (page 89). Modeling of the fuels environment should be based on the height of foliar fuels sufficient to propagate fire. The current approach of using the height of live and dead branches adding up to just 0.01 kg/m3 produces a highly inaccurate canopy base height, leading to an exaggeration of the effects of canopy fuels, and an under appreciation of the importance of surface fuels. The Cone Fire (2002) north of the Creeks project is an example of a crown fire dropping to the ground as a result of insufficient pyrolysis of tree canopies by combustion of surface fuels because these had been effectively eliminated immediately prior to the fire (See Stephens 2004 p.4 attached below). In addition, post-treatment outcomes for Creeks range from 0.04 to 0.167 kg/m3, sufficient for propagation of fire into the canopy if there is sufficient surface fuel to heat it sufficiently to achieve ignition.	The Creeks Project is designed to use a combination of both surface and aerial fuels treatments to create conditions that allow conifer stands in the project area to be more fire resilient (Creeks FEIS, Chapter 3). Aerial treatments (thinning from below) and surface fuel treatments (piling/burning and prescribed fire) are proposed and would compliment each other in reducing fire behavior potential. See also response to comment 17-29.
30-7	If the proposed fuelbreaks are maintained by frequent fire or mechanical disturbance, these perturbations would likely cause shrub vegetation to be replaced by grass and other fine fuel. Grass invasion into fuelbreaks would be a concern for firefighter's safe use of these areas, as intended, because grass fuels support the fastest rates of wildland fire spread of any vegetation due to their ignitability (Andrews and Rothermel 1982). With significant grass growth, the proposed fuelbreaks would accelerate the spread of fire compared to a closed forest (Agee et al. 2000, Ingalsbee 2005). These effects need to be addressed in the FEIS.	It is acknowledged that grassy fuels (fuel model 2) have a higher rate of spread than those seen for fuel model 10 (heavy naturally accumulated fuels) (Rothermel, 1983). That being said, rates of line construction and effectiveness of retardant drops during suppression of fires within grass fuel models is more efficient when compared with litter, duff, and slash fuel models. Even with growth of grass, a DFPZ would be more effective than an untreated forest where all surface fuels and ladder fuels are left in place. Although grass fuelbeds in conifer stands (fuel model 2) can experience rapid rates of spread, those fires generally remain on the surface and can be directly attacked by fire suppression forces on the ground. The Creeks Project FEIS (Chapter 3, Fire and Fuels section) discloses the effects of implementing fuel reduction treatments within the project area.
30-8	An analysis of the amount of acres that can potentially be burned in the Creeks Forest area annually given smoke and other constraints is needed. Reintroduction of a regime of frequent fire may be an unrealistic assumption.	See also response to comment 25-3. Based on considerable experience with the vegetation types, topography, air quality management constraints and seasonal "burn window" opportunities within the Creeks

Comment #	Comment	Response
		Project area, it is estimated that approximately 750 acres per year would be accomplished by prescribed fire.
30-9	Increased Fire Risk -- On page 91 the DEIS mentions group selection (1-2 acre clear cuts) and the regeneration of fire-resistant and shade-intolerant Ponderosa pine. Also, on p. 94, the DEIS regarding the 1-2 acre clear cuts states that, "Wildfires will most likely burn as ground fires in these stands, with areas of torching. Under dense conditions, torching could be fairly extensive; however, fire would drop back to the ground when it came to openings created by group selection." No support is offered for the contention that fire will "burn around them or spot across them"? By what mechanism would the vegetation in these areas become incapable of burning?	See response to comment 19-5.
30-10	The homogenous structure, low crowns and combustibility of plantations and post clear cut vegetation needs to be disclosed, and data on plantation or chaparral combustibility presented. The existing evidence indicates that such vegetation is much more combustible than mature forest vegetation (Odion et al. 2004a). Plantations are even aged and the trees are closely spaced. The dense array of alike sized trees makes plantations prone to higher fire intensity and severity than natural forests because the fuel array they present is readily available to combustion, especially when surface fuels are also present (Weatherspoon and Skinner 1995), as would be the case. Plantations can also elevate fire intensity and severity in adjacent forests (Key 2000). Because of effects to adjacent forests, once a threshold proportion of even-aged plantations are established in a landscape, there is potential for a self-reinforcing cycle of stand replacing fire over the whole landscape (Perry 1995). In addition, maintaining plantations in fire prone landscapes may be self-defeating because they may only mature if fire is excluded, which has not happened in the study area. Successful fire exclusion would be a significant ecological impact. Finally, plantations are highly simplified environments that lack the structural heterogeneity needed to sustain natural levels of biodiversity (Hunter 1999). Impacts of plantations on fire and biodiversity need to be addressed in the FEIS based on a review of existing literature.	Clearcutting is not included as a management tool in the alternatives considered for the Creeks Project (FEIS, Chapter 2). The HFQLG FEIS and ROD (1999) has already decided the purpose and need for implementing group selections within the HFQLG Pilot Project Area. The purpose and need for group selections in the Creeks Project are disclosed in Chapter 1 of the FEIS. Chapter 3 of the Creeks Project FEIS (Silvicultural and Fire / Fuels sections) discloses the environmental effects associated with implementing group selections within the project area.
30-14	Natural disturbances leave legacies (trees, logs, branches, soil organic matter, seeds, etc.), from which ecosystems rebuild. Early successional habitat created by fire, with its rich array of snags and shrub vegetation is particularly important and rare habitat (Lindenmayer and Franklin 2002). On the other hand, harvests that remove most or all trees depending on whether there are 30+ inch dbh trees remove substantial legacy biomass (tree boles), and ground based machinery damages soil legacies. The intensity of a disturbance is proportional to the legacies that remain to function in the disturbance recovery process (reviewed by White and Jentsch 2001). Clearcutting reduces community resilience by removing legacies upon which communities rebuild after fire, and decreases ecological integrity for this reason, and because unnatural processes are introduced. In addition, communities do not recover	The environmental consequences section of the Creeks Project FEIS (Chapter 3) discloses the effects of implementing the alternatives within the project area.

Comment #	Comment	Response
	from novel or artificial disturbances as well as ones they have evolved with (Paine et al. 1998). Often, artificial disturbances make them prone to exotic species invasion and other ecological surprises (Paine et al. 1998). Such effects (e.g. exotic species invasion) are known impacts from the human disturbances proposed (Korb et al. 2003, Keeley 2005). The terms "artificial" or "novel" should be used in conjunction with "structural diversity" in the FEIS so that it is clear that natural diversity is not increased, while the capacity for recovery (resilience) would be impaired. The FEIS needs to fully disclose the known impacts from the treatments proposed for the public to understand the impacts of the project.	
30-15	Fire is a natural process that leaves biological legacies upon which communities rebuild. Because this is an important process for ecosystem functioning (Moritz and Odion 2004), it benefits ecological integrity if it occurs at appropriate rates. On page 94 the Creeks DEIS offers a mere listing of past fires, and past, current and foreseeable projects with no data or analysis effects of those fires and projects. This does not constitute a scientifically adequate or legal cumulative effects analysis.	Additional analysis has been included in all of the cumulative affects sections of the Creeks Project FEIS (Chapter 3), including the Fire and Fuels section with added discussion related to the Storrie Fire. Appendix A has also been updated with additional information.
30-19	There is a need to return the influence of fire in Sierran forests as a disturbance agent that structures forests and creates heterogeneity associated with biodiversity. This can more effectively occur with fires that are not strictly the light surface fires favored by many managers. After a long period of reduced fire influence, fires that decrease stand density and create patchy landscape structure, may help return missing ecological effects of fire. These fire effects have been considered consistent with expediting restoration goals in Sierran forests and similar mixed conifer forests (Miller and Urban 2000; Fule' et al. 2004). Fire also favors pines (Kercher and Axelrod 1984, Keeley and Zedler 1998), by creating openings in the forest canopy and seed bed conditions that favor natural regeneration (Keeley and Stephenson 2000). Thus, efforts to further suppress fire's natural influence using fuelbreaks, silvicultural treatments, and out of season light burning, if effective, would continue the trend of reduced ecological integrity due to lack of fire disturbance. However, it cannot be presumed that these treatments would be effective due to the difficulty in managing surface fuels that increase with silvicultural treatments (Stephens and Moghaddas 2005), including chaparral.	The LNF LRMP (1993), as amended, prohibits wildland fire use (other than prescribed fire) as a landscape fuels treatment. The LRMP requires complete suppression of fires that are not introduced as prescribed fire.
30-20	Provide More Alternatives -- [...] the Forest Service needs to develop an alternative that relies on reintroducing fire with planned ignitions late in the fire season, or managed use of unplanned ignitions, if maintaining the health of the Creeks Forest Area is in fact a management goal. Research by Stephens and Moghaddas (2005) argues that traditional silvicultural treatments do not accomplish fire risk reduction, and there is a need for adaptive management based alternatives rather than continuing the approaches that degrade Sierran Forests. A broader range of alternatives need to be considered. Treatment of surface fuels is the most important priority for reducing fire risk (Stephens 2004, attached below). An alternative	The inapplicability of the 2001 SNFPA ROD has already been decided (Creeks Project FEIS, Chapter 2). The 2004 SNFPA ROD replaced the 2001 SNFPA ROD in its entirety. Additional alternatives have been included in the Creeks Project FEIS (Chapter 2).

Comment #	Comment	Response
	consistent with the 2001 Framework is called for given the public support for its approach to managing public land, and the controversial nature of the proposed logging project. Additional alternatives for meeting economic goals are also warranted. It may be possible to acquire timber volume via the thinning of plantations, logging in the immediate vicinity of structures, and other areas where ecological values are already reduced, or by imposing a smaller diameter limit and greater canopy retention to reduce disturbance intensity, surface fuel loads, and loss of ecological values associated with mature, fire resistant trees.	
30-21	As noted by Dombeck et al. (2004): "Fire programs of federal agencies should focus the overwhelming majority of their hazardous-fuels reduction and suppression efforts on protecting lives and property in the areas where forests and communities meet, including efforts to help landowners reduce fire risk in the immediate vicinity of their homes. Such an approach would help restore natural fire cycles in remote places, save tens of millions of dollars, and, above all, minimize risks to firefighters." Rather than suppression based fuelbreak alternatives, the Forest Service should be developing ones based on adaptive management that address the most important problem, protecting lives and property.	The purpose and need for the Creeks Project is discussed in Chapter 1 of the FEIS. The first purpose and need is to implement the 1998 HFQLG Act. The Creeks Project FEIS considers the effects of implementing alternatives (Chapter 3) for implementation DFPZs and area thinnings as part of an extensive fuel treatment network for reducing the potential size of wildfires, and providing fire suppression personnel safe locations for taking actions in the event of a wildfire within the Creeks Project area. The action alternatives are intended to implement a DFPZ as part of an extensive fuel treatment network that is effective in reducing the potential size of wildfires, protect communities at risk, and providing fire suppression personnel safe locations for taking actions in the event of a wildfire.
30-22	The Creeks Project appears to be a continuation of the fire management approach that is said to be the cause the problems it is attempting to fix—suppression of the influence of fire. This is a far cry from adaptive management. By failing to accommodate fire disturbances and introducing anthropogenic disturbances, the activities proposed would lower ecosystem resiliency and natural diversity and promote exotic species invasions. Such effects reduce ecological integrity. The DEIS does not explain these impacts to the public. Rather than suppression based alternatives, the Forest Service should be developing ones based on adaptive management that address the most important problems without unnecessary collateral damage to ecosystem integrity.	See response to comment 30-19.
32-48	As discussed in the comments of Dr. Dennis Odion, the information and analysis in the DEIS regarding the impacts of the Creeks project on fire and fuels issues is inadequate. (Odion 2005). For example, the DEIS fails to disclose information regarding the severity of wildfires, fails to discuss the results of recent research indicating that logging medium and large trees is not necessary to reduce risk of catastrophic wildfire (Stephens and Moghaddas 2005), fails adequately to assess the extent to which group selection units and unmaintained DFPZ units may add to wildfire risk, and fails to address a range of reasonable alternative strategies for reducing the risk of stand-replacing wildfire. Please see the comments of Dr. Odion for more detailed discussion of these issues.	The Creeks Project FEIS (Chapter 3, Fire and Fuels section) discloses the effects of implementing fuel reduction treatments within the Creeks Project area.
34-1	The portions of the Storrie fire adjacent to the Creeks project boundary burned mostly	The Storrie Fire (August and September, 2000), located within and adjacent to the

Comment #	Comment	Response
	at low and moderate severity. How do you explain this in light of your dire predictions based upon Condition Class and your estimations of surface fuels? Is any portion of the Creeks project within the Storrie fire perimeter?	Creeks Project area, demonstrated how fire would likely behave in vegetation types similar to Creeks under severe fire weather conditions. The vegetation communities (including Condition Classes 2 and 3) in the Storrie Fire were similar in stand structure and species composition as Creeks. Of the 56,000 acres that burned 19,000 were moderate to high intensity, with entire stands of trees killed as a direct result of fire-related injuries (Storrie Post-Fire Restoration project EA, 2001). An assumption is made that a fire in the Creeks Project area under current conditions and similar weather would experience moderate to high intensity fire.
Wildlife		
1-4	Cutting down trees affects all wildlife and birds and makes them homeless, causing death, stress resulting in injury, etc. i do not believe that there will be no effect on the numerous "sensitive" species - that is fakery in my opinion.	The analysis (FEIS, Chapter 3, Wildlife section) displays the effects to species that are known or expected to occur within the project area.
11-4	In Table S-5 at the top of page 15, it would appear that additional verbiage needs to be included under Alternative -2 Forest Service sensitive species. The "No effect to these species" is a simplification of the threat of overstocked stands and subsequent hazardous fuel conditions that will feed the catastrophic forest fires that toast these critters. As a matter of fact, I suggest you down played all of the forthcoming impacts of catastrophic forest fires to all of the tables under Alternative – 2.	Alternative 2 does not have predictable actions in terms of time and space that would allow a site specific determination of effects. While it is true that catastrophic fire would likely affect those species and their habitat, the time, place, and intensity of the fire or any other natural disaster, cannot be predicted and therefore cannot be modeled. The effects due to Alternative 2 are found in the various resource discussions within the FEIS (Chapter 3).
16-1	In our paper describing the current distribution of the American marten in California (Kucera et al. 1995:101), we noted the marten's apparent absence in parts of the northern Sierra Nevada, in particular Plumas County, despite considerable survey effort there. This contrasted with the marten's apparent current occurrence throughout most of its original range in the Sierra Nevada to the south and southern Cascade Range to the north. Subsequent survey efforts have reaffirmed the conclusion that martens are absent from much of their historic range in the northern Sierra Nevada and southern Cascade Range, especially on the Plumas and Lassen national forests (USDA Forest Service 2001, FEIS, Vol. 3, Chap. 3, Part 4.4, p. 22; Zielinski 2002). Marten are documented to occur throughout much of the Creeks planning area (DEIS, p. 120). Maintaining marten habitat within the Creeks planning area would increase the likelihood of marten becoming reestablished in the area to the south, where they have been extirpated, and thus reestablishing connectivity with marten populations further to the south. In contrast, the Creeks Project will further degrade remaining marten habitat, reduce marten populations, and diminish the connectivity of marten habitat in the region, increasing the likelihood that local marten populations will become isolated and potentially extirpated. American martens are inherently vulnerable to local extirpation and extinction for	The analysis within the FEIS discloses the effects of the Creeks project to marten (FEIS, Chapter 3, Wildlife section). The analysis within the FEIS states that the project is likely to have three main impacts to marten: reduction in quality of habitat within individual home ranges, increased potential for mortality due to predation, and a reduction in the quality of connective habitat. Therefore, the analysis agrees with the commenter on these points. To address connectivity issue, Alternative 14 was developed (FEIS, Chapter 2) which improved habitat conditions and provided for better connectivity between areas of high quality habitat. Alternative 14 includes changes to the DFPZ prescription in key areas that link high quality habitat. The changes include a higher canopy cover (40% - 45%), higher down log retention (15 – 20 tons/acre), and areas left untreated (10% of the stand).

Comment #	Comment	Response
	several reasons, as noted in the Sierra Nevada Framework EIS (USDA Forest Service 2001, FEIS, Vol. 3, Chap. 3, part 4.4, pp. 22-23). First, martens have low reproductive potential; second, they have an affinity for dense overhead cover and tend to avoid forest openings; and third, martens have very large home ranges relative to their body size. Thus, habitat changes that would alter the marten's preferred habitat, such as the changes that would result from the Creeks Project, could reduce the marten's range and distribution, lead to local extirpation, delay reestablishment after extirpation, and further isolate the marten population to the south from those in the north.	
16-2	Throughout their range, American martens are associated with late-serai coniferous forests with abundant large structure, including live trees, snags, and logs, and relatively closed canopy cover (Spencer et al. 1983, Alien 1987, Buskirk and Powell 1994). This large structure is thought to provide safety for martens while resting or denning, thermal cover and access to subnivean sites during winter, and food and cover for much of their prey, including ground (Eutamias spp.) and tree squirrels (Tamiasciurus spp., Glaucomys sp.). In my studies in unmanaged and lightly managed Jeffrey pine, mixed- and subalpine-conifer forests on the east slope of the Sierra Nevada on the Inyo National Forest, martens used large trees, snags, and logs, averaging 35, 39, and 46 inches in diameter, respectively, and ranging down to 16, 24, and 20 inches, respectively, for rest sites (Kucera 1997, 2004a; USDA 2004, Vol. 3, Part 4.4, p. 21). This was similar to results from another study on the eastern slope of the Tahoe National Forest (Spencer et al. 1983). Thus, medium and large trees and snags with diameter 20 inches and greater constitute an important structural element of marten habitat. Particularly on the west slope of the Sierra Nevada, martens are closely associated with dense canopy forests. In general, martens prefer dense forests with canopy cover of 70 percent or greater and avoid relatively open forests with canopy cover of 40 percent or less. Martens are also known to avoid fragmented forest, that is, forest with many open areas. Hargis and Bissonette (1997) and Hargis et al. (1999) found that martens did not occur in forests that contained more than 25% openings, including natural openings and those resulting from timber harvests. Additional research (e.g., Chapen et al. 1998, Potvin et. al. 2000) also documents the deleterious effects of extensive forest openings on marten distribution and habitat use. Impacts of the Creeks Project on the Marten The Creeks Project involves 5,905 acres of defensible fuel profile zones (DFPZs). The Creeks Project also proposes thinning on 3,285 acres, and group selection logging on 1,245 acres (DEIS, p. 11). Overall, the Creeks Project proposes to treat approximately 10,435 acres, much of which currently supports marten (DEIS p. 120; Figure 3-3). Table 3-30 of the DEIS states that the Project will render unsuitable	The analysis and species account in the FEIS discloses similar information as presented by the commenter, such as marten being associated with mature, densely canopied forest, downed logs and large snags. The FEIS analysis also discloses reductions in habitat quality for the marten, as reviewed by the commenter (FEIS, Chapter 3, Wildlife section). The commenter references p. 130 of the DEIS as stating that DFPZ maintenance would result in permanent habitat loss. The DEIS on p. 130 actually states that with DFPZ maintenance the stands would continue to provide marginal values for foraging. The analysis also states that the project would have the potential to decrease the local population numbers through increased home range size. However, the analysis also disclosed uncertainty that, without further home range information, impacts to populations could not be accurately predicted. The FEIS includes Alternative 14 (Chapter 2) that addresses improved connectivity for marten for areas consider key to maintaining habitat connectivity (FEIS, Chapter 3, Wildlife section). Please also refer to response to comment 16-1.

Comment #	Comment	Response
	2,656 acres of moderate and high-quality marten habitat. (Anomalously, the Table 3-30 also indicates that the project will result in an increase of 274 acres of CWHR type 5M. How this could happen is not explained.) More than half of the DFPZs are currently suitable marten habitat (DEIS p. 129). Table 3-31a (DEIS p. 129) indicates that 1756 acres of marten habitat will be lost. Because the Proposed Action includes DFPZ maintenance on a 10-year schedule, this habitat loss would be permanent (DEIS p. 130). Group-selection logging would remove an additional 893 acres, scattered throughout the project area. This habitat reduction and fragmentation make it likely that this project will reduce the marten population, as is stated (DEIS pp. 129, 131).	
16-3	The DEIS (p. 126) asserts that the 30% canopy cover to be maintained in Prescription B is sufficient "to allow movement through an area," citing Thompson and Harestad (1994). This assertion is based on weak evidence. On page 123, the DEIS states "Thompson and Harestad (1994) found marten avoided forests with less than 30% canopy cover and preferred a canopy of 50-75%." Thus, according to the Thompson and Harestad (1994) figures, 30% canopy coverage is a bare minimum that may be tolerated, not a goal to be achieved to maintain martens. Further, the Thompson and Harestad paper is a review of literature, not original research, and their canopy-cover figures are assumptions. The relevant quote from Thompson and Harestad (1994:359) is "Our generalized models for the management of American marten habitat are based on the following assumptions: 1. American martens will use forest with a canopy of at least 30% - and prefer a canopy of 50-75% - in which more than half is provided by mature or old softwood trees." Original research conducted on the Tahoe National Forest found that".. .marten throughout the study area preferred stands with 40-60% canopy closure at both resting and foraging sites, and avoided stands with less than 30% closure" (Spencer et al. 1983:1183). Thus, forests with 30% canopy closure should be regarded as not adequate to provide even moderate marten habitat. The description of Prescription B in the DEIS (p. 35), however, contains no standards for minimum canopy retention, so even the marginal habitat provided by 30% canopy cover is not assured.	Analysis within the FEIS reveals that canopy closure of 30% or more was sufficient to allow movement through an area by marten but that denser canopy of 50-75% was preferred (FEIS, Chapter 3, Wildlife section). That 30% canopy cover is considered a minimum for marten was recognized within the FEIS. The commenter suggests that the information provided by the referenced paper by Thompson and Harestad (1994) was weak evidence. The FEIS cites additional data supporting the findings in Thompson and Harestad (1994). The other source (Spencer et al 1983) used by the commenter further supports the FEIS analysis that forested stands with canopy cover of 30% or more may be utilized by marten. Despite the indication by the commenter, the FEIS clearly shows that 30% cover is considered to provide low quality habitat (FEIS, Chapter 3, Wildlife section). The FEIS addressed the concern that connectivity could be adversely affected through the addition of Alternative 14 (FEIS, Chapter 2) which was designed to provide better connectivity in key areas. Refer to comment 16-1 for information on Alternative 14.
16-4	The proposed habitat loss and fragmentation will further reduce or eliminate north-south habitat connectivity between the Plumas and Lassen National Forests, thus further isolating marten populations to the north and south (DEIS, pp. 126-130). This is a particular concern because the private lands to the east of the project area have apparently been heavily logged in the aftermath of the Storrie fire (DEIS, p. 241; Storrie Fire EA, p. 118 ("the private lands ... that were harvested will remain unsuitable (for forest carnivores) for several decades due to the removal of the majority of material")). Therefore, the cumulative effect of the Creeks project together with recent logging on private lands could be to eliminate habitat connectivity and	The Creeks analysis did disclose effects to north-south habitat connectivity for marten (DEIS p. 126-131, FEIS, Chapter 3, Wildlife section). The analysis indicates the treatments would reduce canopy cover in some areas to 30%, which, as disclosed, is at the lower end of suitability. However, literature cited in the DEIS and FEIS, Chapter 3, Wildlife section (Thompson and Harestad 1994, and Takats et al. 1999) support the analysis that stands with >30% canopy would be sufficient to allow travel of marten through the treated areas. Also, RHCA buffers in key areas were established to provide a key linkage and connectivity to higher quality habitat to the north. Therefore, while the analysis disclosed impacts to habitat quality and effects to

Comment #	Comment	Response
	discourage marten north-south movement. This appears to be contrary to the requirements of the QLG pilot project, that "habitat connectivity ... be maintained to allow movement of old forest... species between areas of suitable habitat" (USDA Forest Service 1999, p. 9).	connectivity, the assessment was that the project would continue to provide for the north-south movement of marten through the Creeks analysis area. The FEIS includes Alternative 14 (FEIS, Chapter 3, Wildlife section) that addresses the issue of habitat connectivity. Please refer to comment 16-1.
16-5	My concerns about habitat connectivity are exacerbated by the proposal to log intensively within the habitat management areas that were set aside to protect forest carnivores like the American marten. According to analysis by Britting (2005), the Creeks project will log 624 acres of the forest carnivore network, including 532 acres that will likely be rendered marginal or unsuitable as marten habitat. According to the forest plan, one purpose for establishing the network was "to provide breeding areas and travel corridors to facilitate movement of individuals and genetic exchange throughout the length of the Forest" (Lassen National Forest 1992, p. T-l). The forest plan set these areas aside from scheduled logging based on the fact that the Lassen has "limited suitable furbearer habitat," that "existing habitat is being fragmented by continued logging," and that "there is no research data or other empirical evidence to suggest that we can harvest within furbearer areas and still maintain suitable habitat conditions" (Lassen National Forest 1992, p. T-2). To the best of my knowledge, there is no new scientific information that would change these conclusions. Therefore, based on the Forest Service's own findings, the proposal to log within the forest carnivore network is likely to further disrupt habitat connectivity, degrade existing habitat, and increase the risk that the marten population will become isolated or extirpated.	See response to comment 16-4.
16-6	The DEIS fails to include the kind of information and analysis that would be necessary for a thorough and careful evaluation of the Creeks Project's cumulative impacts on the marten. For example, the DEIS does not include a map displaying the location of past, present, and planned projects within and in the vicinity of the Creeks project area that are likely to affect marten habitat. The DEIS simply lists sixteen timber sales that have occurred since the 1980s, and presents a small-scale map (Figure 3-4, p. 128) showing polygons of presumed marten habitat before and after implementation of the Creeks Project. Nor does the DEIS analyze the amount of marten habitat that will be lost if other planned projects are implemented. The one-sentence reference to the proposed "Willow Project" (DEIS, p. 131) simply mentions the possibility of further habitat reduction and loss of habitat connectivity to be expected from it. As a result, the DEIS does not adequately disclose the extent to which such other projects may cumulatively affect the distribution and connectivity of habitat. Similarly, the DEIS does not disclose the extent to which these projects will create additional forest openings, thereby contributing to forest fragmentation and decrease in the quality of marten habitat. This is insufficient for a thorough and careful evaluation of the Creeks Project's cumulative impacts on the marten.	Cumulative effects for marten are discussed within the FEIS (FEIS, Chapter 3, Wildlife section) and references Appendix A (FEIS) for more information on past and foreseeable future actions. The discussion of cumulative affects also addresses the impact of past actions on key habitat characteristics. A map in Appendix A does show the location of past, present and planned projects within and in the vicinity of the Creeks project which depicts polygons of marten habitat that illustrate the result of past projects and the spatial arrangement of currently existing habitat. The commenter argues that the cumulative effects section does not analyze the amount of marten habitat that will be lost if other planned projects are implemented, including the Willow Project. However, as stated in the FEIS, the Willow Project is currently in the planning stage and thus explicit knowledge of the amount of habitat that would be altered or lost is unknown at this time for these future projects. A more thorough discussion of the cumulative effects discussion is included within the FEIS, particularly with regard to changes due to the addition of Alternative 14 (FEIS, Chapter 3, Wildlife section). Please refer to comment 16-1.

Comment #	Comment	Response
	The information on logging of private lands in the DEIS is particularly deficient. The DEIS fails to disclose or analyze the amount and intensity of past, present, and proposed logging on private lands within and near the Creeks project area. As noted above, the Storrie Fire EA suggests that private lands to the east of the project area have been heavily logged, rendering habitat unsuitable for forest carnivores. However, this information is not disclosed or assessed in the Creeks DEIS, making it impossible to assess the landscape-level impacts on the marten of implementing the project. By reducing the amount of marten habitat and increasing the percentage of forest openings, the Creeks Project is likely to adversely affect the marten, particularly when considered together with other past, present, and planned logging within the Quincy Library Group pilot project area. I have previously reviewed the QLG project and concluded that it is likely to threaten the viability and distribution of the marten in the northern Sierra Nevada (Kucera 2004b). The Creeks Project will substantially contribute to these adverse impacts.	
16-8	The Pacific fisher is a forest carnivore that is closely associated with older forests with medium and large trees, dense canopy cover, and abundant large snags and down wood (Buskirk and Powell 1994). The Creeks project would degrade fisher habitat by logging medium and large trees, reducing canopy cover, removing large snags and down logs, and fragmenting the remaining forest.	As explained on pages 120 and 121 of the DEIS and within Chapter 3 of the FEIS, fisher do not appear to overlap with marten, and snow depth may limit fisher distribution. Due to this habitat preference of fisher, and because of the elevation and average snow depth of the project area, the project area was considered to provide very limited habitat for fisher. Thus, because fisher appear to be extirpated from the northern Sierra (DEIS p. 120, FEIS, Chapter 3, Wildlife section), and due to the very limited habitat within the project area, fisher were excluded from the Creeks analysis. Therefore the Creeks project would not degrade fisher habitat, threaten fisher viability or contribute to the present trend towards extinction (FEIS, Chapter 3, Wildlife section).
16-9	The USDI Fish and Wildlife Service (USFWS) concluded that the fisher warrants protection under the Endangered Species Act. The USFWS (USDI 2004, p. 18788) cited loss and fragmentation of habitat and further decline and isolation of populations as the primary threats to the fisher, and questioned the adequacy of the 2004 Sierra Nevada Forest Plan Amendment to protect fisher habitat. The USFWS (USDI 2004, p. 18788) specifically mentioned "timber harvest, fuels reduction treatments, and road construction" on federal lands as threats to fisher "distribution, abundance, and recovery/recolonization potential." Under these circumstances, the fisher's habitat in the Sierra Nevada requires protection and restoration, not further degradation. Unfortunately, the Creeks project will further degrade fisher habitat, threatening the fisher's viability and contributing to the present trend towards extinction.	See response to comment 16-8.
16-10	As mentioned briefly in the DEIS (p. 120), the fisher's current distribution in California comprises two populations, one in the southern Sierra Nevada and the other in the Klamath Province, separated by some 260 miles. This isolated population structure	The commenter's perception of a contradiction within the DEIS in statements regarding fisher and marten habitat appears to arise from a misinterpretation of a statement on page 120 of the DEIS. This misinterpretation led the commenter to

Comment #	Comment	Response
	is a major reason that the USDI Fish and Wildlife Service decided that the fisher warranted listing as threatened or endangered (USDI 2004). The Creeks project area is within historic fisher range (Grinnell et al. 1937; Zielinski et al. 1995; USDI 2004). The DEIS (p. 120) states "Suitable fisher habitat is similar to that described for marten (Table 3-29)", yet on p. 123 states "Based on habitat preferences the project area provides very limited habitat for this species therefore the project would have little or no affect (sic) on the totality of habitat within its former range. Because neither individuals nor suitable habitat would be affected, the fisher is not further analyzed in this document." If suitable fisher habitat is similar to that of marten, and if there is marten habitat throughout the project area, then there is likely to be suitable fisher habitat. The decision to eliminate fishers from analysis in the document, based on a contradiction, is unsupportable. In my comments on the Draft Supplemental Environmental Impact Statement, Sierra Nevada Forest Plan Amendment (USDA 2003) and on the Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement and Record of Decision (SNFPA ROD; USDA 2004), I concluded that the revised Sierra Nevada Forest Plan, including actions under the Herger-Feinstein Quincy Library Group (HFQLG) Forest Recovery Act, would allow degradation of fisher habitat in the central and northern Sierra Nevada and southern Cascade Range (Kucera 2003, Kucera 2004b). These areas are essential to facilitate the fisher's recovery from its imperiled status and to prevent further decline and possible extinction of the species in the Sierra Nevada. That the DEIS for the Creeks Project simply dismisses consideration of impacts of the project on fishers and their recovery is a glaring deficiency in the analysis.	state that the decision to eliminate the fisher from analysis based on a contradiction was unsupportable. On page 120 of the DEIS a statement is made that suitable fisher habitat is similar to that described for marten. As stated in the FEIS (FEIS, Chapter 3, Wildlife section), the overall structural habitat requirements are similar for the two species. However, as further explained on pages 120 and 121 of the DEIS and Chapter 3 of the FEIS, fisher do not appear to overlap with marten and snow depth may limit fisher distribution. Due to this habitat preference of fisher, and because of the elevation and average snow depth of the project area, the project area was considered to provide very limited habitat for fisher. Thus, because fisher appear to be extirpated from the northern Sierra, and due to the very limited habitat within the project area, fisher were excluded from the Creeks analysis; the decision to exclude fisher from analysis was not based on a contradiction. Similarly, the commenter states that the central and northern Sierra, as well as the southern Cascade Range are essential to facilitate the fisher's recovery and to prevent further decline and possible extinction of the species in the Sierra Nevada. This may or may not be a valid observation in a general, large scale sense, but because of the lack of fisher habitat in the project area due to elevation and average snow depth, this observation does not appear to be valid for the site-specific area covered by the Creeks analysis area.
16-11	The Creeks project area appears to be particularly important in reestablishing habitat connectivity for the fisher. As described in Britting (2005) and discussed above, the DEIS fails to disclose or analyze the amount and intensity of past, present, and proposed logging on private lands within and near the Creeks project area. As noted above, the Storrie Fire EA suggests that private lands to the east of the project area have been heavily logged, rendering habitat unsuitable for forest carnivores. However, this information is not disclosed or assessed in the Creeks DEIS, making it impossible to assess the landscape-level impacts on the fisher of implementing the project. Because the project area is surrounded on the east by heavily logged industrial timberlands, it comprises important potential habitat providing north-south connectivity for fisher, as well as marten. Therefore, in my professional opinion, degrading the habitat that currently exists, as proposed in the Creeks project, is likely to increase risks to fisher recovery and reduce the likelihood of establishing a viable population within the project area and throughout the Sierra Nevada.	As explained on pages 120 and 121 of the DEIS, and Chapter 3 of the FEIS, fisher do not appear to overlap with marten and snow depth may limit fisher distribution. Due to this habitat preference of fisher, and because of the elevation and average snow depth of the project area, the project area was considered to provide very limited habitat for fisher. Thus, because fisher appear to be extirpated from the northern Sierra, and due to the very limited habitat within the project area, fisher were excluded from the Creeks analysis. Therefore, because the Creeks analysis area was considered unsuitable for fisher, a landscape-level impacts analysis for fisher as recommended by the commenter was not required for the Creeks analysis area, and the proposed actions within Creeks should not increase risks to fisher recovery or reduce the likelihood of establishing a viable population within the project area or throughout the Sierra Nevada, as stated by the commenter. The Creeks analysis did disclose affects to north-south habitat connectivity for marten (DEIS p. 126-127, 129-131, FEIS, Chapter 3, Wildlife section). The analysis indicates the treatments would reduce canopy cover in some areas to 30%, which, as disclosed, is at the lower end of suitability. However, literature cited in Chapter 3 of

Comment #	Comment	Response
		the FEIS (Thompson and Harestad 1994, and Takats et al. 1999) support the analysis that stands with >30% canopy would be sufficient to allow travel of marten through the treated areas. Also, RHCA buffers in key areas were established to provide a key linkage and connectivity to higher quality habitat to the north. Therefore, while the analysis disclosed impacts to habitat quality and effects to connectivity, the assessment was that the project would continue to provide for the north-south movement of marten through the Creeks analysis area. This issue was addressed in Alternative 14 (FEIS, Chapter 3, Wildlife section) where moderate habitat quality is maintained within areas considered important to maintaining connectivity to areas of high quality habitat.
16-12	I have concluded that the Creeks Project could adversely affect the American marten, potentially leading to isolation and extirpation of local marten populations. The Creeks Project will also impede the recolonization of the area by fisher and decrease north-south habitat connectivity for them, thus hampering their recovery The DEIS as currently drafted fails to provide sufficient information to disclose and analyze these impacts or to offer alternative management plans that would reduce these adverse impacts while still achieving fuels reduction objectives. Therefore, the Forest Service should issue a revised DEIS that includes the necessary information and analysis, and the Forest Service should select an alternative that would result in fewer adverse impacts to the marten and its habitat.	Effects to marten habitat and populations were analyzed and disclosed within the FEIS (FEIS, Chapter 3, Wildlife section). The analysis states that due to decline in habitat value as a result of the proposed actions, home range size for marten may expand, thus possibly leading to a reduction in marten population within the project area. The analysis also indicated uncertainty regarding the ability to accurately predict impacts to marten populations due to lack of home range information. As a result of this analysis, the determination of effects to marten due to the proposed actions was that the actions may affect marten individuals, but was not likely to result in a trend towards federal listing or loss of species viability. Because of the elevation and average snow depth of the project area, the project area was considered to provide very limited habitat for fisher. Thus, because fisher appear to be extirpated from the northern Sierra, and due to the very limited habitat within the project area, fisher were excluded from the Creeks analysis. Therefore, because of the unsuitability of the project area for fisher, the proposed actions should not impede recolonization of the area by fisher or decrease north-south habitat connectivity for fisher, as stated by the commenter. As a means of responding to public comments and concerns regarding this project, Alternative 14 was developed (FEIS, Chapter 2). Please refer to comment 16-1.
17-9	The removal of wildlife trees within GS units diminishes forest animal habitat and decreases forest health. The guarantee that any wildlife tree within the project unit that is removed during operations will be replaced with one of similar wildlife value does nothing to alleviate the inconvenience experienced by evicted wildlife. The process of replacing wildlife tree with one of similar value is not clear. Will you be climbing trees to chop tops, girdleling trees to create dead snags, planting trees with double-top genetics? Wildlife tree data will be used only when available so many valuable wildlife trees will be taken with no ecological compensation.	Removal of trees within group selections is indeed trading one habitat for another. The loss of trees is likely to result in an increase in shrubs, a habitat far more rare than size class 4M stands where the group selections dominate. Girdling has been shown to be a wasted effort as wildlife use of girdled trees is very low. The purpose of replacement is to ensure that we maintain at least the minimum number of snags committed to in the FEIS (Chapter 2). If a wildlife tree is removed to facilitate operations (for safety or operational reasons) another tree that may have been marked for removal and is of the same size and condition, must be used as a replacement.
17-30	Page 63 of the Creeks DEIS mentions dwarf mistletoe as a disease organism without any mention of the positive habitat value Arceuthobium presents for many species of	It is recognized that dwarf mistletoe can provide suitable nesting platforms for a variety of bird and mammal species. However, this was not identified as a significant

Comment #	Comment	Response
	birds.	issue during project development and is not discussed in the FEIS.
17-35	The USFS analysis [DEIS page 102] chooses to avoid the term "old growth" simply because it can be used to describe individual trees. But the presence of old trees [trees that are structurally mature (flat top, characteristic bark patterns) or close to snag recruiting condition] provide both critical habitat for nesting animals and potential for small area disturbance that promotes shade intolerant pine regeneration. There is no reason not to consider individual or group old growth trees simply because they may be in large blocks or may raise emotional reactions from non-professional forest lovers in the public.	The FEIS points out that using the term "old growth" is confusing to readers (FEIS, Chapter 3, Wildlife section). The term "old growth" has no relevance when referencing single trees. In our analysis we included both structural and spatial components of large tree habitat rather than depend on terms that have widely differing interpretations.
17-36	This DEIS analysis also minimizes the use of the term "fragmentation" especially as it pertains to forest carnivore HMAs and travel corridors that have been eliminated from analysis. But the institutional memories of forest ecologists have not forgotten the connectivity concept. Until the forest carnivore maps have been updated, the information recognized in previous rounds of forest management discussions will be a pertinent issue.	The network of forest carnivore territories and corridors established in the LNF LRMP (1993) are no longer recognized land allocations as per the 2004 SNFPA ROD. In lieu of this network, the 2004 SNFPA ROD established consistent standards and guidelines that were deemed sufficient to maintain marten and fisher viability within the Region. Although the Creeks FEIS does not analyze effects to these abandoned land allocations, the FEIS does disclose effects to marten and marten habitat and determined that the proposed activities within Creeks may affect marten individuals, but are not likely to result in a trend towards federal listing or loss of species viability (FEIS, Chapter 3, Wildlife section). Potential effects to connectivity and habitat fragmentation for marten were analyzed and disclosed within the FEIS. The issue of connectivity raised in the comments resulted in the development of Alternative 14, which addresses connectivity (FEIS, Chapter 2).
19-1	Status of the California spotted owl in the Creeks Project Planning Area In 2001, researchers conducted a meta-analysis of population dynamics of the California spotted owl from 5 long-term demographic studies, including one on the Lassen National Forest (Franklin et al. 2004). Apparent survival probability from the 5 studies combined was lower than survival probability from a separate meta-analysis of 15 studies of northern spotted owls. Estimated population trend (λ) for California spotted owls on the Lassen National Forest from 1992-2000 was 0.985 (SE = 0.026), where $\lambda = 1$ indicates a stable population, $\lambda < 1$ indicates a declining population, and $\lambda > 1$ indicates an increasing population (Franklin et al. 2004). The point estimate of λ indicated an average population decline of 1.5% annually. Other analyses of the Lassen owl population indicated a decline in owl site occupancy from 1993-1998 (Blakesley et al. In Press). Together, these results cause significant concern regarding the viability of the California spotted owl population in the northern Sierra Nevada, including the project area. In June, 2005, the US Fish and Wildlife Service (USFWS) released a 90-Day Finding on a Petition to List the California Spotted Owl as Threatened or Endangered (Federal Register 70:35607-35614). In the 90-Day finding, USFWS announced	The cumulative effects of fully implementing HFQLG pilot project was modeled, analyzed and displayed in the 2004 SNFPA FSEIS. This documented cumulative effects to habitat across the entire Sierra Nevada range, including the HFQLG pilot project area. This analysis formed the basis for the determination on owl viability across the entire Sierra Nevada range. The Creeks project site-specific cumulative effects were based on a 32,570 acre analysis area, of which approximately 29,727 acres are composed of National Forest. This analysis area is defined as the project treatment areas plus an additional larger land base determined by potential direct, indirect and cumulative effects on spotted owls. The findings of the draft meta-analysis estimating lambda were considered in the analysis, however, the viability determination is made at the bioregional level which is beyond the ability of this analysis. The analysis also recognizes that there remains some level of uncertainty regarding the ecology of the California spotted owl. Hopefully these will be answered at least in part within the Plumas Lassen Administrative Study (PLAS).

Comment #	Comment	Response
	initiation of a status review of the California spotted owl despite a decision by the USFWS in 2003 ("12-month finding"; Federal Register 68:7580) not to list the subspecies. The recent 90-day finding was due in part to a change in the US Forest Service's Sierra Nevada Forest Plan Amendment (SNFPA) between 2001 and 2004: "After publication of our 12-month finding, the Forest Service issued a revised SNFPA (USFS 2004a) that allows for full implementation of the HFQLG Pilot Project, and for more flexibility in locating and implementing effective fire-fuels treatments than did the 2001 SNFPA (USFS 2001)." [Federal Register 70:35611.] "...We are aware that recent changes to the 2001 SNFPA (USFS 2001)...may affect California spotted owl habitat. Accordingly, the petition and information available in our files present substantial scientific information that due to the change in regulatory mechanisms since our last status review, existing regulatory mechanisms may be inadequate to ensure the continued existence of the California spotted owl..." [Federal Register 70:35612]. These statements illustrate that timber harvesting under the HFQLG raises significant concerns with respect to the status of the California spotted owl.	
19-2	At a local scale, my research has followed spotted owls at 14 of the 18 territories in the Creeks Project area over the past 15 years (Table 1). In 2002-2004 we thoroughly surveyed these areas (at least 3 complete nighttime surveys each year) and detected 10 owls at 5 to 6 of the 14 sites each year. In contrast, 12 of these same 14 sites were surveyed in 1991, resulting in detections of 23 owls at 12 sites. The cause(s) for decline in the number of spotted owls in the past decade is unknown. However, loss of spotted owl habitat throughout the Creeks Project area may have been a factor. Within 1.5 miles (representing 4500 acre home range) of the 14 spotted owl territories followed over the past 15 years, 11,373 acres have received one or more types of timber harvest from 1990-2005 (GIS data from the Lassen National Forest: "past vegetation management activities"). These treatments included overstory removal, clearcut logging, shelterwood logging, and various types of thinning. In addition, although I do not have access to maps of forest stand conditions on private lands, it appeared in the field that 3 owl sites became vacant following timber harvest on private lands. One territory became vacant following timber harvest on Forest Service land within the spotted owl nest grove (the nest was outside of the PAC), and one site became vacant three years after the Storrie fire. Interestingly, the latter site (PL046) successfully fledged young in 2002 from a tree scarred during the Storrie fire. Although it is possible that one or more of the sites vacated will become re-occupied, these cases provide evidence that habitat loss outside of PACs is associated with reduced numbers of spotted owls within the Creeks Project area.	The reduction in the number of active territories was noted in Chapter 3 of the FEIS (FEIS, Chapter 3, Wildlife section). The analysis also shows that while owl territories have declined, there is no clear relation between the number of acres affected by vegetation management activities and territory occupancy within the project area. The acres of each treatment type are outlined within the Wildlife section of Chapter 3 along with a brief analysis of the impacts to key habitat attributes. This data is used in assessing the cumulative effects.
19-3	Home Ranges and Habitat Associations of the California Spotted Owl in the Creeks	The data in the comments was considered and cited in the analysis. The core area

Comment #	Comment	Response
	Project Area Spotted owl home ranges in Sierra Nevada coniferous forests are approximately 5715-12,473 acres (Verner et al. 1992) and averaged 10,530 acres in a study on the Lassen NF (Bingham and Noon 1997). Home Range Core Areas (HRCAs) are defined as the portion of a home range that receives disproportionately high use (Bingham and Noon 1997). Across 3 studies of northern and California spotted owls followed using radio-telemetry, Bingham and Noon (1997) found that the core area typically comprised approximately 22% of the home range and included 60-70% of an owl's breeding season activity. For the Lassen area, the average core area size was approximately 2008 acres. Both the 2001 and 2004 Sierra Nevada Forest Plan Amendments recognized the importance of protecting spotted owl Home Range Core Areas (defined in the SNFPAs as 1000 acres on the Lassen National Forest). Desired conditions for spotted owl HRCAs were defined in the 2004 SNFPA Record of Decision (p. 40) as follows: "HRCAs consist of large habitat blocks that have: (1) at least two tree canopy layers; (2) at least 24 inches dbh in dominant and co-dominant trees; (3) a number of very large (greater than 45 inches dbh) old trees; (4) at least 50 to 70 percent canopy cover; and (5) higher than average levels of snags and down woody material." Bart (1995) found for northern spotted owls that both adult survival and the number of young produced per pair increased with increasing amounts of suitable habitat in areas surrounding spotted owl nests or activity centers. Bart (1995) estimated that northern spotted owls would require 32-50% suitable habitat within their home ranges in order to maintain stable owl populations. The range (32-50%) was based on different (unknown) estimates of juvenile owl survival. Bart (1995) cautioned that habitat in all owl home ranges should not be reduced to the minimum level. Subsequently, the Sierra Nevada Science Review (USDA Forest Service 1998:24) recommended that "in the absence of clear reasons why these results [Bart 1995] would not apply to the California spotted owl as well, they need to be considered in planning for the owls in the Sierra Nevada". As noted in the Creeks DEIS, suitable nesting habitat for California spotted owls in the Creeks Project area consists of stands dominated by trees ≥ 24" dbh, with ≥ 40% canopy cover (CWHR classes 5M and 5D). Additional research in the Sierra Nevada suggests that at least 50% canopy cover in spotted owl nest stands is preferable for promoting spotted owl productivity (Hunsaker et al. 2002). Fifty-six percent of spotted owl nesting on the Almanor ranger district of the Lassen NF occurred in CWHR classes 5M and 5D, even though these stands comprised only 16% of the area within 1 mile of 67 spotted owl territory centers (Blakesley et al. In	size given in the comment was based on data gathered from territories in east side habitats where home ranges are considerably larger. The size of the core area for the Almanor Ranger District is identified in the 2004 SNFPA ROD. The analysis based the size of the breeding home range on the data by Verner et al (1992). The data presented by Bingham and Noon (1997) was from a study completed primarily on east side of the Forest (Eagle Lake Ranger District) which is assumed to have much larger home ranges. Owls on the Almanor Ranger District are presumed to have the same home range sizes as the Plumas west side habitats. Bart's (1995) data was used extensively in the analysis and was used to assess the risk to individual territories. The data for suitable habitat provided in the comment corresponds to the methods used in the analysis to determine suitable habitat. The Wildlife discussion within Chapter 3 of the FEIS provides an analysis at both the territorial (landscape) level as well as a smaller (near nest) area. The impacts to the Home Range Core Area as defined by the 2004 SNFPA ROD is also provided.

Comment #	Comment	Response
	Press; territory centers were generally defined by nest trees). No nests occurred in stands dominated by trees < 12" dbh (CWHR classes 1-3), nor did any nests occur in stands dominated by trees 12-24" dbh with canopy cover < 40% (CWHR classes 4S and 4P). Stands of CWHR class 4M comprised 24% of the area within 1 mile of 67 spotted owl territory centers, yet contained only 9% of all nesting attempts. Stands of CWHR class 4D comprised the remaining spotted owl nesting. However, I found that 4D stands with remnant (>30" dbh) trees ≥1.2/ha comprised 6% of the area and contained 14% of nesting attempts whereas 4D stands with remnant trees <1.2/ha were used for nesting in proportion to availability within the mapped area (12%) (Blakesley et al. In Press). As noted in the Creeks DEIS, suitable foraging habitat for California spotted owls in the Creeks Project area consists of stands dominated by trees ≥ 12" dbh, with at least 40-50% canopy cover (CWHR classes 4M, 4D, 5M and 5D). In my research on the Almanor Ranger District of the Lassen NF, including the Creeks Project area, composition of 2010 acre Core Areas averaged 32% in CWHR 5D and 5M, plus 45% in 4D and 4M (Blakesley 2003). This amounts to an average of nearly 1550 acres of "suitable" spotted owl habitat immediately surrounding spotted owl territory centers. Furthermore, I found spotted owl survival was positively associated with the amount of suitable habitat within both 500 acre and 2010 acre areas surrounding spotted owl site centers (Blakesley et al. In Press). In other words, in both areas somewhat larger than PACs and areas equivalent to HRCAs (as defined by Bingham and Noon 1997), survival increased as the amount of suitable habitat increased. In addition, both spotted owl site occupancy and reproductive output decreased with increasing amounts of non-habitat within 500 acre areas around site centers. In addition, spotted owl site occupancy decreased with increasing amount of area dominated by CWHR 4D and increased with increasing amount of area dominated by CWHR 5D within 500 acre areas. Consequently, timber harvest within HRCAs may have significant adverse impacts on spotted owl survival, reproduction and/or site occupancy.	
19-6	The DEIS presents the results of modeling the effects of DFPZs on fire behavior as well as the effect of taking no action (Alternative 2). Effects of area thinning on fire behavior were not modeled, although the DEIS (p. 91) states that fire behavior under Treatments F,G, and H would be similar to those under A, B, and C. Furthermore, in reference to Area Thinning, the DEIS (p. 27) states: "Providing a higher canopy closure-thinning regime would maintain suitable habitat at a higher level while still reducing the risk of stand-replacing wildfire through the reduction of surface, ladder, and canopy fuels." These statements acknowledge that Area Thinning prescriptions, which retain greater canopy cover than DFPZ thinning, would be as effective as	The FEIS (FEIS, Chapter 3, Wildlife section) analysis recognizes that area thinnings provide less of an impact to the owl territory and may, over the long term, improve habitat through increasing a multi-layered structure.

Comment #	Comment	Response
	DFPZ prescriptions in reducing the severity and extent of wildfire. Under Alternative 1, DFPZs would result in loss of 1784 acres of suitable spotted owl foraging habitat (CWHR classes 4D, 4M, and 5M) due to reduction in canopy cover below 40%. In contrast, Area Thinning would be less likely to adversely affect suitable spotted owl foraging habitat because canopy cover would be retained at or above 40%.	
19-8	The value of snags to wildlife depends on snag size, snag species, and decay class. Similarly, the standing time of snags depends on snag size, snag species, and decay class. Therefore, information presented in DEIS on number of snags by decay class only (e.g., Table 3-22) is not very useful. Snags should be tallied by size, species, and decay class, and prescriptions for snag retention within thinned areas should specify sizes of snags to be retained, with an emphasis on retaining the largest snags available. Verner et al. (1992:21) recommended: "Save the largest snags ≥ 30 inches in d.b.h., to a maximum of eight snags per acre; if this is < 20 square feet basal area per acre, save snags < 30 inches in d.b.h., from the largest down, to a total of eight snags per acre or 20 square feet basal area per acre, whichever comes first; need not retain snags < 15 inches in dbh or <20 feet tall." These guidelines are ecologically meaningful, and should be implemented in the Creeks Project and other projects on the Lassen and Plumas NFs.	The FEIS provides a summary of the data which shows data with respect to snags within the project area (FEIS, Chapter 3, Wildlife section). Snag data more than 2 years old is generally out of date due to the natural loss and recruitment of snags. Contrary to the comment made, snag decay class is very important in determining the existing amount of potential forage and nesting habitat for primary cavity nesters. This specific issue was discussed in the MIS section, Chapter 3 of the FEIS (FEIS, Chapter 3, Wildlife section). Snags are retained commensurate with what is available on the landscape. Consequently, while desirable the opportunity to select snags by species is limited to what is available. The data gathered from project snag inventories was used to determine the snag marking guidelines in terms of priorities for marking. The minimum snag size recorded for our snag analysis was 15 inches dbh and 20 feet tall and is presented in the FEIS (Chapter 2). The FEIS also provides the snag marking guidelines that prioritizes selection criteria (Appendix D).
19-11	Cumulative effects of past timber harvest and other management actions are not adequately addressed in the Creeks Project DEIS. Appendix A of the DEIS simply lists the names, dates, and acres of past timber harvest. The Appendix should also disclose the type of logging used (prescriptions) and acres of pre-and post harvest cover types affected. This should be followed by a discussion of the environmental impacts of past logging, including quantification of the amount of spotted owl habitat improved, degraded, or lost through past management actions.	Chapter 3 (Wildlife section) of the FEIS contains additional information on past timber harvest activities and the cumulative effects of these activities on the spotted owl. Additional information has been included in Appendix A to clarify past timber harvest activities.
19-12	The DEIS provides for limited operating periods within known spotted owl and goshawk nests. It also provides for protection of newly found goshawk sites and adjustments to the marking prescription within the goshawk territory (p. 45). Under the DEIS the Creeks Project would not provide similar protection to newly found spotted owl nests; it should do so.	Yes, if nesting owls are found they would be provided protection according to the current direction (FEIS, Chapter 2). This is stipulated in the FEIS and tiers to the direction found in the 2004 SNFPA ROD on page 37. The direction calls for delineating a 300 acre protected activity center around the nest site.
19-13	Although the Creeks Project would not allow harvest within 300 acre spotted owl Protected Activity Centers (PACs), the PAC represents a small fraction (5-15% or less) of the forest landscape used by individual owls for foraging and other activities. Table 3-24 (DEIS p. 112) presents the existing acres of suitable spotted owl habitat within 4500 acre home ranges for 19 California spotted owl territories within the Creeks project area. Although the Creeks DEIS claims that the 2004 SNFPA FSEIS and ROD indicate that spotted owls require only 1000 acres of suitable habitat within their home range (pp. 111-112), this conflicts with the recommendations of the Sierra	As outlined in the FEIS (FEIS, Chapter 3, Wildlife section) the reference to the 1,000 acres of suitable habitat reflects direction of the 2004 SNFPA ROD outside of the HFQLG pilot project area. The 1,000 acres represents the acres presented in the SNFPA as the mapped area of the bio-regional owl management strategy that will become direction within the Creeks Project Area at the end of the HFQLG Pilot Project. The selection of either Alternative 1 or Alternative 14 would result in a reduction approximately 8 - 10% of the available suitable habitat. Additionally there is approximately 2,500 acres of CWHR 3P, 3M, and 3D within the project area, much of

Comment #	Comment	Response
	Nevada Science Review (see above) to retain 32-50% of the home range in suitable habitat. I am not aware of any research that supports the statement in the DEIS that owls only require 1000 acres of suitable habitat within each territory. To the contrary, as discussed above, both my research (Blakesley 2003, Blakesley et al. In Press; see above) and that of Bart (1995) suggest that spotted owls on the Lassen NF need much more than 1000 acres of suitable habitat within their home ranges, and that reducing the amount of habitat within owl territories, especially within Home Range Core Areas, can adversely affect demographic factors such as owl survival and fecundity. The preferred alternative would render 1784 acres of spotted owl foraging habitat unsuitable for foraging through loss of canopy cover, and would completely remove 893 acres of spotted owl foraging habitat from the Creeks Project area through group selection. In addition to group selection areas, an undisclosed number of large trees (20-30" dbh) would be removed within 4950 acres of currently suitable foraging habitat. Given the size of spotted owl home ranges in the study area and proximity of the proposed harvest units to spotted owl PACs, the loss and degradation of foraging habitat would be likely to impact most, if not all, of the spotted owls in the project area. This is contrary to the statement in the DEIS (p. 110), "... the proposed prescriptions are expected to have little affect [sic] on the overall amount of foraging habitat".	which will develop suitable habitat attributes over the next decade. Given the amount of existing suitable habitat and the amount that will develop, the impact to the amount of foraging habitat when considered at the landscape level, is relatively minor. However, to place that into context, the actual number of territories affected were considered in the FEIS as well as the relative amount of habitat remaining within each territory and across the landscape, commensurate with the effects of the alternative analyzed (FEIS, Chapter 3, Wildlife section).
19-15	The magnitude of the effect that the proposed loss and degradation of foraging habitat would have on spotted owl site occupancy, survival and reproduction is unknown, but the direction of the effects would likely be negative. Within the Creeks Project area, half of the spotted owl territories studied from 1990-2004 have become vacant concurrent with timber harvest on both Forest Service and private lands. In light of the recent trends in site vacancy, the estimated decline in spotted owl population within the Lassen NF, and consideration by the USFWS to list the California spotted owl as threatened or endangered, it would be irresponsible to knowingly degrade and remove spotted owl habitat in the name of "Forest Health Recovery" when viable alternatives exist for restoring forest stands to pre-fire suppression conditions.	The FEIS provides a risk assessment for the California spotted owl which displays the relative impact of the activities considered in the analysis (FEIS, Chapter 3, Wildlife section). The FEIS recognizes that owl territories have become vacant and also recognizes that timber harvest actions have likely contributed to declines in owl territories. However the FEIS also recognizes that the amount of habitat alone cannot explain the decline and that other factors may have been acting synergistically. Alternative 14 was developed (FEIS, Chapter 2) in part to address the issue of impacts to habitat on those territories at highest risk based on the amount and condition of the habitat. Please refer to comment 16-1.
27-21	The DEIS fails to adequately analyze the cumulative impacts/effects of the logging conducted on private lands following the Storrie fire of 2000. Such logging removed thousands of acres of forest and spotted owl habitat (most of which was not severely burned).	The FEIS analyzes the impacts to owls affected by the fire event as well as continuing changes to the landscape brought about by the long-term conifer mortality (FEIS, Chapter 3, Wildlife section). The impacts to owls within the Storrie Fire area was considered in an earlier biological evaluation completed to adjust PAC territories (Biological Evaluation for the Storrie Fire Realignment: Protected Activity Centers and Spotted Owl Habitat Areas 2001). The findings in the BE and the effects of the Storrie Fire were considered in the analysis.
29-1	The National Environmental Policy Act (NEPA) requires the FS to disclose the direct,	The cumulative effects of fully implementing HFQLG pilot project was modeled,

Comment #	Comment	Response
	indirect and cumulative impacts to the environment of past, current and reasonably foreseeable future actions (40 CFR, 1508.8, 1508.7; 1508.25) We believe your analysis was insufficient to come to the conclusion there will be no significant effect on the environment of the Creeks area. Lassen National Forest (LNF) water quality, riparian habitat, recreational values, wildlife, fuel reduction and sustainable wood supply will be put in jeopardy by this project. Your list of past, present and reasonably foreseeable future actions within the 33,000 acre Creeks project area is outlined on page 240 of the DEIS. This list includes logging on 18,247 acres or 60% of the project area in the last 20 years. I would like to see in the final EIS an estimate of how many of these 18,247 acres was California spotted owl or American marten habitat. According to my records the Lost Tom and Lost Lakes timber sales removed 300 acres of nesting habitat and 230 acres of foraging habitat in the home range of the Peacock Point owls. Ruffa, Fanani, Shanghai and the Windthrow projects were all within suitable CSO habitat. You now propose to reduce 3716 more acres within the project area to unsuitable. (DEIS pg. 112. The Storrie fire burned 56,060 acres of high habitat for old growth species in the Feather River watershed in 2000. 5300 acres of this land has been subsequently clear-cut by private logging companies and over 1,000 acres has been cut on FS land. The huge "Yellow THP" by SPI is ongoing right in the middle of the Creeks project area. This plan is on its 7th amendment in the THP process. "Yellow" is logging 2045 acres in the same Yellow and Grizzly Creek watersheds. It also should be noted that on page 149 of the DEIS you map the land ownership of the Creeks area. SPI owns the land in the middle of the project area, not Beaty, and this is where the Yellow THP is ongoing. Are you using this logging in your cumulative effects analysis if it is mapped incorrectly? How can the public make a determination on affects or trust your analysis if the mapping is incorrect? You do not list any acres affected by "Yellow" or other private land logging on page 242 of the DEIS.	analyzed and displayed in the 2004 SNFPA FSEIS. This analysis documented cumulative effects to habitat across the entire Sierra Nevada range, including the HFQLG pilot project area. This analysis formed the basis for the determination on owl viability across the entire Sierra Nevada range. As the project followed the standards and guidelines within the 2004 SNFPA FSEIS, the viability assessment and determination did not change. The cumulative effects section quantifies effects of fire to owl territories within the Storrie Fire area (FEIS, Chapter 3, Wildlife section). The impacts of the Lost Tom and other sales are included as changes over time. Looking specifically at one or two sales does not represent an accurate picture of changes. However, the cumulative changes in habitat is considered within the Wildlife and Silvicultural Resources sections of the FEIS (Chapter 3). The FEIS displays the impact that the various types of treatments had on the habitat attributes considered in the analysis. The FIES considers the effects in terms of loss of the attributes as a cumulative effect (FEIS, Chapter 3, Wildlife section). The commenter is correct about the land exchange from Beaty to SPI within the Creeks Project area. The map in Chapter 3 has been corrected to reflect this change.
29-3	Your private/public land analysis is also very unclear in the discussion of the CSO on pages 109-114. You make several confusing statements. "A review of the 4,500 ac. territories that could be affected by the project shows that all territories currently have >1,000 acres of suitable habitat based on vegetation analysis. However, if only federally managed lands on the LNF are considered, five territories have less than 1,000 acres of suitable habitat" pg. 109	Private lands are not considered in calculating the amount of suitable habitat since the Forest Service does not direct actions on private lands. This is neither positive nor negative. While privately managed lands may contribute to the overall amount of suitable habitat within a territory, private lands are under different requirements and are not part of the overall strategy for the management of spotted owls within the Sierra Nevada. Therefore, the assumption is made that private lands do not contribute to the amount of habitat to territories located primarily on federally managed lands.

Comment #	Comment	Response
	"Of the five territories (with <1,000 acres of suitable habitat), only PL 309 would see a reduction of habitat within the territory due to the proposed activities. Territory PL 309 is primarily on private lands and the FS lands are at the edge of the territory." Pg. 112 Footnotes 5 & 6 for Table 3-24: Treatment effects summary-owl territories says: "This includes only NF lands on the LNF" and "This figure only considers federally managed lands as private lands cannot be counted on to maintain habitat within the territory". Pg. 112 " The actions, along with similar habitat changes on the private lands, would act cumulatively with the Proposed Action to reduce the overall habitat value within the project area for the CSO. At this point in time, however, most of the territories exceed minimal standards of 1,000 ac. of suitable habitat, especially when the suitable habitat on private lands is considered." (Pg. 113) So we would ask, are you using private lands positive, and or negative values in your cumulative impact assessment? What also needs to be heavily emphasized in the analysis is that we are talking about a sensitive bird with a 4,500-acre home range in the Almanor Ranger District. This analysis is using the absolute minimum of 1,000 acres for a standard or guideline for viability.	As explained in Chapter 3 of the FEIS, the 1,000 acre figure that is used was derived from the analysis done for the 2004 SNFPA FSEIS and is part of the overall direction for the management of the California spotted owl for areas outside the HFQLG Pilot Project Area. The SNFPA direction for the remainder of the Sierra Nevada bioregion will be implemented within the project area at the completion of the HFQLG Pilot Project and the anticipated direction is therefore considered. The need to maintain 30% - 50% suitable habitat across the landscape (Bart 1995) is also discussed as another threshold to provide a more complete analysis.
29-4	Future QLG actions to start as soon as 2006 are the Willow project adjacent to Creeks. This plan will heavily log 13,100 acres, much within high quality old forest habitat. The Jonesville Forest recovery, Jonesville and Philbrook DFPZs and Browns Ravine Oak enhancement DFPZ are also planned in this same area in the next years. LFPG is understandably skeptical of this DEIS as we have been following Forest Service plans for this area since 1997. Each time a project is proposed, it is not implemented because the conclusions reached in the cumulative effects determination cannot be supported by the analysis. We see this again in this document, literally filled with negative statements about habitat loss and degradation, synergistic impacts, and managing to the minimum for species. I will also repeat my statement I made in my Creeks scoping comments on page 2, March 9, 1005. The original 1998 Castle Rocks Environmental Assessment Biological Evaluation addendum states "Activities within the past decade have reduced suitable habitat for the CSO in the areas analyzed in this addendum. The activities proposed in this EA will meet CASPO objectives but will reduce the attributes preferred by the owls within the core area described. These actions,	The comment highlights one of the issues associated with a project analysis, the wide variety of interpretation of data. From an ecological definition, the Willow project is highly unlikely to affect high quality "old forest" habitat. As stated in the Wildlife section (FEIS, Chapter 3, Wildlife section), the term "old forest" was avoided simply because there is no common understanding of the term. In an ecological context very little, if any, of the treated stands would be considered "old forest" as the stands are relatively young and have not developed many of the attributes associated with "old forest". SOHAs are no longer part of the owl management strategy. The statement that 32 of the SOHAs did not have suitable habitat is incorrect. While some inclusions of unsuitable habitat may have occurred, the SOHAs retained the best owl habitat available. With regard to the Storrie Fire, the Lassen Forest Preservation Group contended during the development of the Storrie project that the fire impacted little suitable owl habitat and in fact provided a mosaic of habitat conditions beneficial to wildlife. The commenter confuses PACs with the home range analysis. None of the PACs would be entered and therefore there would be no loss of habitat within the PACs.

Comment #	Comment	Response
	considered with those expected from the Lost Lake T.S. are likely to further reduce the ability for this pair to successfully reproduce." In the EA on page 21 it says " Cumulatively the two actions (Castle/Lost Lakes) are likely to contribute to a loss of viability for the pair, as those areas heavily utilized by the pair are likely to lose the attributes preferred by the owls". This "area" they are referring to is within the Creeks project area near Peacock Point. Six stands were deferred from logging due to CSO use. Since 1998, the Storrie fire has burned through this area and dead trees logged. If these owls were in jeopardy in 1998 and things have actually worsened, how can you make a determination that individuals may be affected, but this is not likely to cause a trend towards federal listing? I will repeat again the determination of the appeal-reviewing officer in the Castle project, 6/99 when he overturned the decision memo. " There is no complete analysis of cumulative effect to the CSO....THE EFFECTS OF THE PROPOSAL CANNOT BE DETERMINED, AND WE ARE NOT ABLE TO UNDERSTAND WHY, WITH SEEMINGLY LARGE IMPACTS, THERE IS NO TREND TOWARD LISTING OF THE CALIFORNIA SPOTTED OWL". Castle was a project ¼ the size of the Creeks project. We contend you cannot make a determination there will be no significant effect on all the sensitive species of the Creeks area. You will be taking out 3716 acres of suitable CSO habitat. "Thinning and GS activities would affect 32% of the existing suitable habitat.". (Creeks DEIS, pg. 111 Creeks project. Some PACs on the map are practically surrounded by thinning, DFPZs and GS. The PAC in the area of T26NR6E section 6 has 2 area thins punched right in the middle of it. Many PACs are laced with roads that should be closed. I will reiterate what I said in scoping comments " This project area is simply some of the best remaining old growth and CSO habitat on the LNF, not including wilderness and roadless areas. The LNF designated 40 SOHAs in 1992 to provide a "minimum" viable population of CSO on the LNF. Each of these SOHAs was to contain 1,000 acres of base habitat plus 650 acres of replacement habitat. We now know the CSO may range to 9,000 acres and that 4,500 acres is a typical home range. The LNF was deficient in suitable CSO habitat when the LRMP was written in 1992. Thirty two percent of the SOHAs did not contain suitable habitat. Has this changed? You have given us the "existing suitable FS acres" in the table on page 112. According to this table, of the 19 PACs in the Creeks area, only 8 have over 50% suitable habitat in the home range of 4,500 acres. After the Creeks project only 3 of the PACs will have over 50% suitable habitat in their home range. Five of the PACs will be below the 1,000 acres considered to be minimal for viability for an	The conclusion cited in the DEIS and FEIS (Chapter 3, Wildlife section) was drawn from the determination from the Biological Evaluation for the 2004 Sierra Nevada Forest Plan Amendment (SNFPA) which considered the viability at the bioregional level. Since this project follows the direction in 2004 SNFPA FSEIS, and there has been no new information on owl viability since the issuance of the SNFPA, the assumption is that species viability is maintained. No determination for viability is made at the project level. The determination cited in the Creeks Project FEIS tiers to the 2004 SNFPA ROD and FSEIS, which analyzed the impacts of fully implementing the HFQLG Pilot Project. The SNFPA found that if projects adhere to the guidelines laid out in the 2004 SNFPA ROD, the project would not lead to a trend towards listing. Viability determinations are made for species within the bio-region, in this case the Sierra Nevada range, and not at the project level. Since the project follows the direction in the ROD, the determination was considered appropriate.

Comment #	Comment	Response
	owl pair. And yet you conclude, "The project is not likely to result in measurable impacts to the species although there will be impact to the amount of suitable habitat within territories treated under this project." (DEIS, pg. 112) When we look at the map of the proposed entire HFQLG land allocations it is unbelievable you could come to this conclusion in a cumulative impact assessment of the CSO and other old forest species in the Creeks area. 66% of the planned logging area has a canopy cover of 60-100%. You plan to take this down to a 30-50% canopy cover. Hunsaker et al (2002) found that "changes in canopy-cover composition of less than 10% can significantly affect occupancy". These are specific, substantive, significant concerns you should consider when reaching a decision.	
29-5	It is [...] interesting that you say on page 102 of the DEIS, " The analysis will also generally refrain from the use of the term fragmentation except where specifically defined as a measure of impact to the species or its habitat." I cannot understand how you can do an analysis of the CSO or other sensitive species in the LNF without considering the effect of fragmentation on habitat. It doesn't take a scientist to simply look at the map of Creeks and determine that this plan will increase patchiness, fragment the already minimal habitat for late seral species and isolate populations. In the 1992 CASPO report, 13 years ago it states, "Future management activities must not increase the mean nearest neighbor distance among suitable pair sites. Subtle factors that uniformly decrease habitat quality, or increase fragmentation will act to reduce population density and incrementally increase the uncertainties associated with successful dispersal and mate-finding". (Verner et al. 1992, p. 184) The Creeks area is also in an "area of concern" identified by Verner et al. in 1992. These areas are already discontinuous or naturally fragmented, or there is little information about owl densities. The planned project will only increase fragmentation making successful dispersal and reproduction more difficult.	The FEIS addresses the term fragmentation and the difficulties in addressing "fragmentation" where habitat is degraded but still considered marginally suitable (FEIS, Chapter 3, Wildlife section). The term fragmentation, like "old growth" has a growing number of interpretations with no one definition that is universally accepted. It is also species-specific. Placing a clearcut in a landscape dominated by conifer stands may be fragmenting habitat for spotted owls but it can also be described as increasing forage value for deer. Fragmentation is also easy to describe when all habitat attributes are removed as within a clearcut, however, when stands are treated, as with this project, where minimal attributes, such as canopy cover are met, the use of the term becomes clouded. Timber harvest prescriptions have changed considerably from CASPO and "fragmentation" is not so easily identified or defined. Alternative 14 addresses the area of concern that was brought up by several comments (FEIS, Chapter 3, Wildlife section). The FEIS reviewed the maps of the Area of Concern (2001 SNFPA planning maps) and noted that the area does not meet the definition of an area of concern as defined by Verner et al (1992) and the mapping completed for the 2001 SNFPA FEIS planning process had not gone through any verification process and therefore the usefulness of the mapping for project level analysis is limited. Regardless, Alternative 14 addressed the concern through a reduction of impacts to that area.
29-8	We cannot conclude, with your insufficient analysis that you have truly assessed the affect of this plan on the sensitive species in the project area. Your preliminary determination for the CSO "is based on current species knowledge and tier to the determination found in the BE and BA completed for the Sierra Nevada Forest Plan Amendment Final Supplemental EIS (2004 SNFPA FSEIS). The 2004 SNFPZ FSEIS determined that projects following the guidelines within the SNFPA would not lead to a trend towards federal listing for any sensitive species at the bioregional scale."	The FEIS recognizes, and concurs with the observation that there are unknowns with regard to the impacts projects such as this may provide (FEIS, Chapter 3, Wildlife section). Analyzing the various aspects of the controversy is beyond the scope of this document. Alternative 14 addresses several of the concerns through prescription changes that retain more habitat in key areas and within territories most affected by the project

Comment #	Comment	Response
	(Creeks DEIS, pg. 133) However, many respected scientists have concluded that implementation of the 2004 ROD will lead to listing of many sensitive species. Verner 2003; Blakesley and Noon 2003; Noon 2004; Peery 2004; Bond 2003; Franklin et al 2003 have concluded " the 2004 Framework threatens the owl's distribution and viability by allowing logging of medium and large trees, reduction in canopy cover, and reduction in large snags and down logs, particularly within the QLG pilot project where the Creeks project is located." The Fish and Wildlife service agrees and concluded "alternative 2 of QLG poses a significant threat to the long-term viability of the CSO, Pacific fisher and American marten due to loss, degradation, and fragmentation of suitable habitat." (US Fish and Wildlife Service 1999, p. 16,) Your conclusions are unfounded and unsupported by the information in this DEIS. If these are not "significant issues" raised by the public, what are?	(FEIS, Chapter 2, and Chapter 3, Wildlife section).
29-9	Very important to emphasize is the fact that implementation of the 2004 ROD does not ensure the owl's viability in the Creeks area. The 2004-ROD FSEIS did not analyze the site-specific impacts of logging in each project area. The FSEIS directed that local land managers who know the landscape would do detailed analysis. In reading the Creeks DEIS, including all the negative statements about habitat degradation there is no legitimate basis for your conclusion that species will not be harmed by this project.	The Creeks Project analysis follows the direction under the 2004 SNFPA ROD which determined that implementation would not affect the viability of the owl across its range. There are a number of uncertainties associated with the project including the impact of managing a landscape that retains a given amount of habitat. These uncertainties were acknowledged in the analysis (FEIS, Chapter 3, Wildlife section). Please see the response to 29-4 for the discussion on viability determinations.
29-10	Please analyze in the final environmental impact statement the affect of Northern Goshawk and California spotted owl sharing and overlapping home ranges in the Creeks project. How is "suitable habitat" acreage affected by concurrent use of dwindling habitat for these Management Indicator Species?	It is unclear what analysis the commenter wishes to see. Research into the impacts of overlapping goshawk and spotted owl territories is clearly beyond the scope of this analysis. It is known that goshawks will prey upon spotted owl chicks but the long-term impact of that is unknown. Since the habitat requirements for owls and goshawks are substantially different, the effects of habitat loss are different.
29-11	Your basis for determining "suitable habitat" in the analysis also undermines your "may affect" conclusion. At times the analysis is confusing and often double speak. On page 109 of the DEIS you state, "The description of habitat attributes (for CSO) has remained fairly constant: mature or late successional habitat that is relatively dense (>50% cc)." So our assumption is you are using 50% cc as suitable habitat? Your prescriptions go lower than this minimum of 50% cc to 40% cc, ostensibly for research value? Then you say on page 111, "For purposes of this analysis, thinning prescriptions A, C, F, G & H are assumed to result in lowered habitat values, although the stands would remain suitable." These stands will all be reduced to an average of 40% cc according to pg. 38, 68 and 69. So how can these stands remain suitable? In your table, 3-24 on page 112 are you using a 40% cc to determine suitability? You are asking us to accept your viability determination when you are using less than minimum canopy cover figures (40%) and minimum home range figures (1,000 acres). On top of this, your data in table 3-24 clearly shows only 3 of the 19 Home Ranges in the Creeks owl territories will have 50% suitable habitat! The LNF LRMP, appendix S for spotted owl habitat management, listed 40 SOHAs in	Spotted owl researcher (Blakesley 2003) conducting research in the Creeks project area uses 40% canopy as minimum suitable habitat. Furthermore, our GIS modeling does not allow us to accurately differentiate between 40 and 50% canopy closure at the landscape level, except at a few sites where there is site specific data. The prescriptions for area thinning stands vary but in general would retain a higher canopy cover (45% or greater). Also, there is a greater emphasis Alternative 14, Creeks Project FEIS) on the retention of other attributes such as understory canopy (where it exists), snags, and down wood material which were all considered in defining suitable habitat. While canopy closure is often used as a paradigm for suitability, as discussed in the analysis, it is only one factor considered. Please see the response to comment 29-4 for the discussion on viability determinations.

Comment #	Comment	Response
	the LNF. Twenty-one of these SOHAs were in the Almanor Ranger District. I know the numbers have changed slightly, but there are currently 19 SOHAs in the Creeks project area. You plan to adversely affect almost ½ of the SOHAs in the LNF with this project.	
29-12	We also question your determination that the Proposed Action may affect individuals, but is not likely to cause a trend towards federal listing for the American Marten. As with the CSO you make a determination of viability for the marten based on implementation of the 2004 ROD. As with the owl, scientists have concluded the new plan threatens the marten's viability by reducing all the attributes of old forest the carnivore depends on, especially within the QLG pilot project area. (Barrett 2004; Kucera 2004b; Buskirk 2003). As with the owl, the U.S. Fish and Wildlife Service concluded that full implementation of QLG will pose a significant threat to the American marten for the same reasons as above. Again, the 2004-ROD and FSEIS directed that local land managers do site specific evaluation of the effects to marten at the project and forest level. At this point I will simply site all the significant statements contained in the Creeks DSEIS concerning the marten on pages 119 to 131. "Recent survey data indicates that marten are well distributed throughout the LNF, particularly on the Almanor Ranger District (ARD)." "The primary areas marten have been found are along Sawmill Tom Creek, Humbug Summit, Humboldt Summit, Milkhouse Flat, Cirby Meadow and Yellow Creek." Please note most of these areas are within the formerly protected Habitat Management Area (HMA). "Therefore, assumptions on the status of the local population, other than to say that marten are present throughout the project boundary, cannot be made." "Based on Tables 3-2 and 3-29, the project area currently provides moderate habitat overall." "The project would have 3 primary indirect effects: (why are these indirect?), reduction of the value of suitable habitat within treated areas, reduction of habitat value within areas serving as travel corridors (connectivity), and an increase in the overall fragmentation of suitable habitat by increasing the amount of open space between areas of suitable habitat." "The treatment would reduce the utility of the treated area in a manner that may affect the number and size of territories supported within the project area." "Prescription B...would retain sufficient cover (30%) to allow movement through the area. Stands that are more open would conversely increase suitability for predators, especially great horned owls."	The analysis of effects to marten within the DEIS and, FEIS (Chapter 3, Wildlife section) states that the proposed actions within Creeks would reduce high quality habitat within treatment units from 5,842 acres to 3,186 acres, and that within the entire project area, high quality suitable habitat for marten would be reduced 4% post-treatment from 17,693 acres to 15,034 acres. As designed, projects within Creeks would retain large trees >30" dbh, canopy cover would be kept at or above 30% (the minimum for marten travel as analyzed on page 123 of the DEIS and FEIS (Chapter 3, Wildlife section), snag retention would be 4 per acre in mixed-conifer and 6 per acre in red fir, and downed log retention would be 10-12 tons per acre in logs >12" diameter. It is upon these data, as well as the analysis of effects on pages 126-131 of the DEIS and FEIS (Chapter 3, Wildlife section), as well as the determinations of the 2004 SNFPA ROD, that the determination of effects was based. While the concerns of the referenced scientists and US Fish and Wildlife Service may or not be valid at the larger, regional scale, the determination of this site specific project was that the proposed actions may affect marten individuals, but would not lead to a loss of viability or trend towards federal listing (DEIS page 133, FEIS, Chapter 3, Wildlife section). The commenter asks how marten were not considered to be at risk because of the Creeks project due to the creation of a linear strip of low quality habitat between the project area and habitat to the north and south. Low quality habitat is still habitat that is used by the species although may not be preferred. According to the literature referenced in the FEIS (such as Thompson and Harestad (1994) stands with >30% canopy would be sufficient to allow travel of marten through the treated areas. As the commenter states, the analysis of effects to marten does disclose uncertainty related to habitat viability determinations and impacts to populations. However, despite the uncertainty, the determination of may affect individuals but will not lead to a trend towards federal listing for marten was made based on the overall assessment of impacts to habitat the proposed actions would have. As stated above, high quality habitat within the entire project area would be reduced just 4% from the existing condition (FEIS, Chapter 3, Wildlife section). Alternative 14 addressed this concern through the implementation of prescriptions which retain higher habitat values within areas considered key to maintaining connectivity between areas of high value habitat. The prescription includes higher canopy cover densities, greater amounts of down wood and untreated areas to retain a more heterogeneous stand.

Comment #	Comment	Response
	"The Northern sections of T27N, R5E sec. 14, 23, and R6E sec 17, 18, 19, 10 of the proposed action contain the most continuous CWHR 5 stands available within the project boundary. ...A large portion of the moderate to high quality habitat that provides the current connectivity would be reduced to low quality habitat. Specifically, this would result in a linear strip (DFPZ) being placed between an area of moderate to high quality habitat and the remainder of the project area." "The southern-most extent (T26N, R6E sec 27, 28, and 34) provides connectivity from moderate to high quality habitat adjacent to the project boundary. Despite the effect of the Storrie Fire and later salvage sales, some suitable habitat is currently present. Prescription B DFPZ would create a strip of low quality habitat between this area of moderate quality habitat and the remainder of the project area." "GS would double the amount of landbase that lacks cover, increasing it from 5% to 9% (Table 3-30). These calculations do not include land that would be claimed by additional skid trails and landings." According to your analysis (pg.72) clearing for harvest and road construction is expected to impact <1% of the treated areas. This would then double the amount of open areas to 10% in the project area. Virtually all of the 1245 clear cuts are smack dab in the middle of moderate to high marten habitat (pg. 125). "Current direction requires an analysis of project effects on the loss of connectivity (1999 HFQLG FEIS/ROD, 2004 SNFPA ROD)." As quoted above, the Northern and Southern sections of the project will result in a linear strip of low quality habitat between the project area and habitat to the North and South. So how can you maintain this species will not be at risk because of this project? "Sixteen different timber sales have taken place within the Creeks area since the 1980s, which contribute to a cumulative loss of connectivity and increased fragmentation across the project area. ...The two areas containing CWHR 5M, 5D greater than 5 acres in size are surrounded almost entirely by unsuitable habitat, due to past disturbances. No continuous 4M or 4D stands connect these two areas." "Based on the list of past, present and reasonably foreseeable actions this project would combine with other actions to further reduce the overall habitat value and connectivity of existing conditions. The habitat that currently provides connectivity in the two areas of concern would be reduced to low." "The Willow project (QLG, 13,100 acres adjacent to Creeks) would act cumulatively to further reduce the overall amount of habitat on the district and add to loss of connectivity between late successional forest patches." The direct and indirect effects also say " Within this portion of their range, marten	Please see the response to comment 29-4 for information on how the determinations within the FEIS are made.

Comment #	Comment	Response
	have not been studied thoroughly enough to make habitat viability determinations without a great deal of uncertainty." (Guldin & Stein 2003) And in ending you state, "Without further home range information, impacts to populations and the subsequent risks posed by this project and the cumulative effects thus far cannot be accurately predicted." So how can you make the determination that the project may affect individuals but will not lead to a trend toward federal listing? Each of the previous statements predicts dire loss of habitat for this sensitive species and you cannot predict the effects accurately, but you make a determination based on this information.	
29-13	LNF Management direction for MIS species is to provide for high or medium habitat capability for that species or group. You are reducing thousands of acres of habitat to low capability. "It is assumed that providing these habitat characteristics, viability of populations dependent on these characteristics will be guaranteed." (LNF LRMP, pg. O-1). Your analysis does not even mention that habitat capability for marten is already low for snag and road densities. How does your analysis take into account that there is no "travel corridor" (part of MIS direction) to provide connectivity? How does it take into account that the former HMA, where many of the marten were surveyed, will be not only cut off on the North and South end of the project but have several more DFPZs in the middle along with clear cuts? How are you following the MIS guidelines outlined in the LRMP with this project when it very clearly violates them? The 2004 ROD directs the Forest Service to "minimize old forest habitat fragmentation, to assess fragmentation issues in the (BE), to assess potential impacts on habitat connectivity, and to consider retaining forested linkages as part of project level analysis". (2004 ROD, pp 53-54) Your assessment is poor and you have not considered retaining linkages or minimizing old forest habitat fragmentation in this draft environmental impact statement. If you consider the changes you made to the riparian habitat conservation area (RHCA) in T26N R6E sec 29 etc. on page 43, a mitigation measure, frankly the marten and LFPG are insulted. Your analysis demonstrates the possibility of significant impacts to the American marten and its habitat; you also say you cannot predict the effects accurately, yet you rely upon the 2004 ROD to presume marten viability. This is a significant, substantive, specific issue we want addressed and mitigated in the final EIS.	Direction within the LNF LRMP (1993) regarding marten as an MIS was superceded by the 2004 ROD for the SNFPA FSEIS. Standards and guidelines and conservation strategies within the SNFPA FSEIS, as applied to the HFQLG area, were considered sufficient to provide viability of marten within the HFQLG area. Given this new direction, the marten and fisher HMAs and travel corridors originally identified in the LNF LRMP were abandoned as land allocations. Therefore, the direction to apply medium or high capability habitat for marten (whether it be for stand structure, road or snag densities, or other habitat components) simply because they are an MIS no longer applies, nor does direction to maintain travel corridors as land allocations. Therefore, the Creeks project does not violate MIS guidelines as the commenter asserts. Habitat connectivity for marten was discussed within the DEIS, pages 126-131and FEIS, Chapter 3, Wildlife section. The analysis determined that north-south connectivity for marten would be maintained by the Creeks project. The RHCA buffers in the south end of the project area are only one aspect of a more complex analysis considering fragmentation and connectivity. As stated on page 127 of the DEIS, the Creeks project would increase the amount of openings from 5% to 9% of the landbase, well below an apparent threshold of 25% as indicated by the referenced research by Potvin et al (2000) on the same page. Therefore, fragmentation of habitat should not be an issue as a result of this project, contrary to the opinion of the commenter. That the effects of the proposed actions within Creeks would constitute "significant" impacts to marten is the opinion of the commenter. The analysis within the Creeks DEIS regarding impacts to marten did not "rely" on the determination within the 2004 SNFPA ROD as the commenter claims, but was based on site-specific analysis within the Creeks project area. Predicting effects to populations from management actions is not a practice that can be precisely or accurately done at all times, therefore, to bolster the findings within this project-level analysis, the larger scale determination within the 2004 SNFPA ROD was consulted.

Comment #	Comment	Response
		Alternative 14 (FEIS, Chapter 3, Wildlife section) addressed this concern through the implementation of prescriptions which retain higher habitat values within areas considered key to maintaining connectivity between areas of high value habitat. The prescription includes higher canopy cover densities, greater amounts of down wood and untreated areas to retain a more heterogeneous stand.
29-14	The Northern Goshawk has the same viability finding as the CSO and marten in your analysis. The goshawk is another MIS on the LNF. The effects of the marten and the CSO can be applied to the goshawk. We are especially concerned about the post fledging areas (PFAs). Thinning and GS will affect up to 48% of the PFAs in the Creeks project area. "The treated stands would be less complex and would likely have reduced prey availability."...the risk to the species is considered to be low and the impacts temporary." Temporary means, "two to three decades in the area thin and most of the DFPZ areas; temporary means 50 years in the B prescription areas"! You also say if you find a new nest you will protect it with a 125ft buffer and "adjust the marking within the new territory to meet habitat goals to attain suitable nesting habitat within 2 decades! And again, how does the overlap of Goshawk PACs and CSO PACS affect habitat suitability for these species? This question was not answered in from my scoping comments, March 9, 2005.	The project effects to goshawk are expected to be quite different from the effects to spotted owls and forest carnivores (marten). Goshawks require more diversity of habitat than do either marten or spotted owl particularly in terms of foraging habitat. It would be inappropriate to use the analysis for either owls or marten as a surrogate for goshawk. There is no research that studied the impact of overlapping territories for owls and goshawk other than it is documented that goshawks will prey upon owl nestlings.
29-15	Migratory bird species and landbird abundance is a new area for assessment in the Creeks project and LNF since LFPG involvement in forest monitoring. We are pleased to have information available about birds that can be indicator species for the entire planet. Unfortunately, again your determination is baseless: There would be few, if any, measurable effects. (DEIS page 146) What is beautiful about the assessment is the study of birds in the Plumas Lassen Area by PRBO. I will be quoting this study, "Plumas-Lassen Area Study Module on Landbird Abundance, Distribution, and Habitat Relationships, 2004 annual report, submitted March 2005 by PRBO Conservation Science". Pre-treatment data shows that the Creeks area has one of the highest species richness and abundance within the Plumas Lassen Area Study (PLAS) units. These areas are the two highest elevation units in the treatment unit area. These are generally red fir communities at low risk for the "wildfire" the FS is trying to protect them from. It was interesting to note that, "Coniferous forest is one of the most important habitat types for birds in California. The primary objective of the landbird module is to assess the impact of forest management practices in sustaining a long-term ecologically stable forest ecosystem at the local and landscape levels." "The DFPZs in the Creeks project are in more species rich habitat than the	The work completed under the Plumas Lassen Administrative Study (PLAS) is included in this document. PRBO Conservation Science has been involved in a number of Almanor Ranger District projects and has been very supportive of projects that increase shrub and meadow complexes and restore oak habitats such as the Browns Ravine Oak Enhancement Project. Monitoring data has shown that riparian habitats are far and away the most productive habitats, not coniferous forests. As outlined in the PLAS report, the difference in species abundance and species richness although higher in DFPZs in the project area than adjacent areas, was not significant. The actual affect of implementing the DFPZ treatment remains to be seen. The PLAS report recognizes that there may be declines in the abundance of some species but ultimately states that "This is not to say that current management plans should not go forward just because they may cause declines in certain species. The key to good management will be to ensure that negative impacts to some species are met with positive ones for others." The analysis shows that there may be slight increases for species that prefer shrubs and edges, while those species that prefer closed canopied stands may see slight declines (FEIS, Chapter 3, Wildlife section).

Comment #	Comment	Response
	surrounding forest. In fact, three of the DFPZ transects in TU-1 project area (Creeks), were among the most species rich transects surveyed in the entire area in 2004. Though many factors go into determining the placement of DFPZ's we believe proposed forest treatments would have less negative and more positive effects on the avian community if results from our monitoring were incorporated into the final decision making process surrounding their placement." This is significant, very site specific, substantive information that needs to be considered in this decision process. They go on to say, "We expect the DFPZ treatments to have the largest immediate impact on the landscape due to their size and extensiveness, and thus a significant impact on the composition of the bird community within their footprint (and possibly beyond). If understory fuels are cleared, canopy significantly reduced, and most of the snags removed in these areas, we would expect a decrease in species richness and a decrease in the abundance of most of the current local breeding species at these sites. WHILE THE SHORT TERM EFFECTS ARE RELEVANT, MORE IMPORTANT ARE THE LONG-TERM EFFECTS OF THESE TREATMENTS ON THE AVIAN COMMUNITY. In the longer time frame, we expect that species that are associated with closed canopy, basal area, and other shaded forest or heavily stocked conditions will remain below pre-treatment levels...In contrast, we would expect species that favor open forest conditions, including those not present pre-treatment, to increase following treatment, though this is highly dependent on future management of the treated areas." This statement is in sharp contrast to the cumulative effects statement on page 15 of the DEIS, "Project is not likely to have a measurable affect on migratory bird species however it is likely local populations would initially decline within the treatment area." This PRBO statement does not seem to even take into account an analysis of the thinning treatments, especially prescription B, that are not mentioned in their study! Management recommendations include maintaining "an absolute minimum" of 4 snags per acre; retaining shrub habitats, and shrub understory within forested habitats; and "every effort should be given to avoiding placement of groups or DFPZs in size class 4 or 5 forests". Your plan for snag retention at 2-6 per acre is too general. This is too large of a variable. Make it a minimum of 4 snags/ac. as this study, and most others would recommend. It is clear from the PRBO study that Creeks is extremely valuable bird habitat as is. The Creeks area is very diverse, with meadows, riparian areas, an abundance of springs and fens, acres of shrub fields, rocky areas, high elevation, old clear cuts and plantations. Making the determination that migratory and local bird species will	

Comment #	Comment	Response
	remain largely unaffected is simply incorrect. We would also substantively comment that the proposed action is purported to be part of an "administrative study" whereby the broader effects of the project will by used to resolve some of the management issues that have wildlife species as a focal point. "Monitoring of migratory land birds has taken place on the ARD since 1997, and more recently as a key component of the administrative study. The monitoring has led to a set of recommendations for habitat improvement within a number of vegetative landscapes." (DEIS, pg. 99) The recommendations were outlined above and I do not see all of these recommendations implemented in the Creeks DEIS. As often happens with "studies", they are completely ignored by the same companies that make them possible.	
29-16	The complete list of management indicator species (MIS) for the LNF in the Creeks area, excepting those already discussed includes mule deer, black bear, hairy woodpecker, pileated woodpecker and peregrine falcon. Habitat for these species is already low to barely moderate in areas of Creeks, considering the miles of roads, snag numbers and downed wood. There are peregrine falcons nesting in the Eagle Rocks area where there are over a dozen group selections planned. This is a highly visual, dramatically beautiful, small roadless area in the LNF. Road 308 is an area of "high interest in visual quality and part of the Back Country Discovery Trail". We cannot understand how this could in any way be called a "forest health recovery act", when you plan this kind of destruction. The LRMP standards dictate that conditions be maintained for moderate to high habitat for MIS on the LNF. (Appendix O, LNF, LRMP, 1993) We do not see how this project will be following the standards and guidelines set for the LNF.	The LNF LRMP (1993) directs that project effects to MIS during project planning be considered. The direction to maintain moderate to high habitat for MIS applies only to the specific emphasis species identified for each management area. For example, the emphasis species for Butt Creek Management Area are deer (summer range), spotted owl, and willow flycatcher. However, the 2004 SNFPA ROD states that where conflict with previous direction exists, the 2004 SNFPA ROD takes precedence, therefore, several of the standards and guidelines alluded to are no longer feasible due to conflict with overriding direction. Retention of conifers ignores the plight of several MIS which need more open (early successional) habitats, not less to meet the MIS direction to maintain moderate to high quality habitat. For example, the FEIS discusses the decline of mule deer due in part to a lack of forage habitat (FEIS, Chapter 3, Wildlife section). Hairy woodpeckers are routinely found in more open coniferous habitats. Both of these habitats are declining. Peregrine falcon habitat would not be affected by the actions in this project (FEIS, Chapter 3, Wildlife section).
29-29	So what of the owls and goshawk using this area [Grizzly Creek watershed]? How will they fare? Not well I'm afraid, as they are also bordered by burned, clear-cut private lands. Marten have also been sighted in this area. Instead of reducing acres to "unsuitable" in the Grizzly watershed, you should be adding to the SOHAs here. Owl Territories PL050 and PL121 are in this area. You will be "treating" 1797 acres to a minimal 40% cc in these PACs and rendering completely unsuitable 940 acres. Two "G" area thins are planned in section 6 that literally poke 2 holes in the middle of these PACs. New roads will be bulldozed in this section that is now mostly roadless. How does this help recover the health of this forest?	SOHAs are no longer part of the management strategy for the California spotted owl. There are no group selections or other treatments in any PAC. Reducing canopy cover to 40% does not inherently make the habitat unsuitable. Broad scale analysis by Blakesley and others includes conifer stands with 40% canopy in the compilation of the amount of suitable habitat. In this analysis, stands with less than 40% cover were considered suitable only if there were other attributes that enhanced suitability such as snag retention, retention of smaller trees to create a multi-storied stand.
29-44	The California Spotted Owl is again under consideration for listing as a threatened or	The commenter correctly points out that there is a threshold where owl viability would

Comment #	Comment	Response
	endangered species because the protections of the 2001 framework have been removed. Studies of the Northern Spotted owl show 2 major conclusions. First, there is a sharp threshold below which spotted owl viability plunges. The underlying cause is dispersal failure due to scarcity of suitable habitat. Second, the crowding of older owls into remaining suitable habitat as timber harvest continues is likely to produce very high occupancy rates – much higher than would be expected under long-term stable conditions. (Lamberson, McKelvey, Noon 1991, A Dynamic Analysis of Northern Spotted Owl viability in a Fragmented Forest Landscape.) We do not want to push this species or others in the Creeks area to the brink of extinction.	decline. However, as Lamberson et al. (1991) point out, there is no way to pin-point that threshold and no direct empirical means to ascertain whether the population is currently at a high risk of crossing a threshold. The models used made assumptions that do not reflect conditions within the Creeks project area (such as 18% suitable habitat) and that while the principles may apply, the applicability of the study to this project is unclear.
30-12	Cumulative Ecological Impacts -- The concept of ecological integrity provides a framework for evaluating changing environmental conditions and biodiversity as a result of human disturbances. Ecological integrity refers to ecosystem wholeness, including the presence of appropriate species, populations, and communities and the occurrence of ecological processes at appropriate rates and scales (Angermeier and Karr 1994; Karr 1991) as well as the environmental conditions that support these taxa and processes (Dale and Breyeler 2001). Assessing and monitoring changes in ecological integrity facilitates adaptive management (Holling 1978), in which management actions are considered as ecological experiments in an iterative process of corrective improvements toward more sustainable management. There is almost no assessment of the true potential impacts to ecological integrity in the DEIS.	The Creeks Project is one of the actions considered in the 2004 SNFPA ROD. Both the SNFPA and the HFQLG Pilot Project have monitoring integrated into the decision. The results of the monitoring will provide the feedback for future actions.
31-1	The Lassen NF lacks baseline data to support the conclusion in the DEIS or MIS report. The Affected Environment section of the Creeks DEIS p. 105 provides an insufficient summary of the current condition and completely lacks benchmark habitat and population data for the management indicator species identified in the DEIS. The National Forest Management Act and its regulations (36 CFR § 219.19 (a) (2) & (6)) require the Forest Service to evaluate the habitat and population trends of your management indicator species in the planning area. The Forest Service Manual (FSM 2620) also requires the Forest Service to monitor habitat conditions for MIS and to maintain their viability. The FSM and NEPA 40 CFR § 1508.7 requires that the Forest Service assess the cumulative impacts to MIS species. The failure to provide information on benchmark conditions for MIS in the planning area is a fatal flaw of this assessment. If you haven't identified the current habitat conditions and habitat/population monitoring for the MIS, the Forest Service cannot make a scientifically supportable finding as to the health or viability of the indicator species. Baseline data is essential to establishing any long-term monitoring program. Without pre-project monitoring and acquisition of data, it would be impossible to link the impacts with the activity (cause and effect).	The FEIS provides the best baseline data available in terms of populations as well as a summary of the effects that past actions have had on shaping the current conditions (FEIS, Chapter 3, Wildlife section). The FEIS includes additional discussions on cumulative effects. Habitat trends were discussed in both the Wildlife section (Vegetation attributes) and within the Silvicultural Resources section of the FEIS.

Comment #	Comment	Response
31-2	Mule Deer -- The DEIS states that past DFPZ and thinning projects have had little ground vegetation regeneration and the proposed thinning in this project would not lead to any meaningful increase in forage. In a study of forest thinning in Lassen National forest I have found that post-treatment regeneration of vegetation is slow in most of the treated areas (Preston 2002). As disclosed in the DEIS, the Creeks project also proposes to permanently eliminate the areas within the project area that have the highest degree of cover and forage for deer through thinning and DFPZ projects for fuels management.	As discussed in the section analyzing the effects to deer, cover is not limiting (FEIS, Chapter 3, Wildlife section). It is incorrect to say that the areas with the highest degree of forage would be treated under the project or that they would be eliminated.
31-3	Mule Deer -- There is no population monitoring data for this MIS species as required. FS has no data to document habitat use in the project area for winter range, fawning habitat, summer range, or migration corridors. The DEIS discusses that there is a lack of population monitoring data, the population level is unknown and that deer herd numbers are down in all Sierra herds (DEIS p. 135-136).	The FEIS displays the most current population and trend data available and provides data from several differing censusing methods (FEIS, Chapter 3, Wildlife section). Habitat trends and use is also discussed as is the condition of forage and the impacts of management direction.
31-4	The cumulative impact of several projects administered throughout the Plumas and Lassen National Forest areas over the past 10 years was also not addressed in the DEIS. Significant habitat modification from these projects has eliminated forest cover and forage (Preston 2002) and may be negatively affecting deer populations. As with many species, deer herds move throughout their annual life cycle and they do not stay within the boundaries of the Creeks project. Therefore it is necessary to assess the cumulative impact projects as they are likely contributors to the decline in the deer herds of this area. This project adds to the cumulative impact. Deer move throughout their life cycle. Thermal and hiding cover is also essential in the life cycles of deer. Dispersal distances of juvenile male deer were found to be greater in habitats with less forest cover (Long et al. 2005).	While there is no consensus on the cause of the continuing decline of deer populations, decline in habitat quality is considered a main factor. However, several factors may be acting in tandem including reductions in winter range, declining summer range forage, and predation. The analysis considers the declines and the limitations on improving habitat within the summer range. The analysis determined that lack of foraging habitat is the limiting factor not hiding or thermal cover (FEIS, Chapter 3, Wildlife section).
31-5	The DEIS p. 136-137 [...] identifies road density as a potential reason for decline of deer populations. Road densities are very high in the project area ranging from 3-6 miles/sq. mile in the various watersheds in the project area (Table 3-46). The DEIS for the project proposes to create additional roads but to close some roads and decommission others. It has been my experience that once a road is created, road closures are generally ineffective. Gates are removed or destroyed or alternative entries around the gates are created. Thinning of forest stands also creates adequate openings for OHV access for hunting, poaching or woodcutting. (Preston 2002) Additional road closures and decommissioning should be included in the Creeks project FEIS to help halt the declining habitat and population trend in the East Tehama Deer Herd.	Although roads do have an impact on deer due to disturbance, the FEIS does not cite road densities as a potential reason for decline of deer populations (FEIS, Chapter 3, Wildlife section). Road density is one parameter in describing the overall habitat suitability.
31-6	There is no meaningful monitoring data or forest-wide cumulative effect analysis provided in the DEIS. Species such as mule and black tail deer migrate regularly out of a project area into winter range via migration routes, seasonally, and therefore must have winter range, migration routes, summer range and fawning habitat considered in the cumulative effects analysis. Since 1992 the Lassen National Forest	Population trend data is the responsibility of the State of California, Department of Fish and Game (DF&G). The DF&G estimates deer populations and trends for the East Tehama deer herd three ways, through a ratio of recorded kills during deer season, counts they use to analyze the population, and annual surveys completed through the US Forest Service and Lassen Volcanic National Park employees. This

Comment #	Comment	Response
	Plan directed the Forest Service to determine population and habitat trends (LNF Forest Plan 5-29). The habitat has been significantly altered in many areas of the Lassen. The deer population is estimated by CDFG to have been reduced by 60% since 1992 yet monitoring and habitat studies have not been conducted and provided in this DEIS (1999 LNF Forest Plan Monitoring Report p. 64).	data was displayed in the discussion of effects (FEIS, Chapter 3, Wildlife section).
31-7	Black Bear -- There is no population monitoring data on the black bear. The DEIS states that little data is available on the current status of bear but that CDFG shows a slight increase in hunter success (C A F&G, 2004) and that it is difficult to determine whether this translates into an increased population at the local level. CDFG estimates populations based on a matrix system that relies on bear hunter reporting. (Draft Environmental Document, Bear Hunting 2001). Studies suggest that high predation rates (in this case, hunter kills) are more a function of prey vulnerability than of prey density (Craighead and Craighead 1956, Smith 1972, Charnov et al). It is important to note that visibility or sightings of bear may also be a function of habitat degradation rather than population increase (Preston 2002).	Population data is derived from Department of Fish and Game records as cited in the Wildlife section of Chapter 3 within the FEIS. Statewide bear populations are trending upwards based on California Department of Fish and Game statistics.
31-8	The cumulative effect of projects should be, at minimum, forest-wide. Black bear home range is extensive. The estimated home range for male bears is 52 square kilometers and 26 square kilometers for females. (Koch 1983) although home range varies with the availability of food and cover abundance (Rudis and Tansey 1995). Localized failure in mast production or a regional scarcity of key fall foods results in bears having to travel long distances for foraging increasing the likelihood of disturbance to agriculture and attraction to human-related food sources (Harger 1967, Bray 1974, Rogers 1976, 1987, Rogers et al. 1976, Hugie 1979, Landers et al. 1979, Beeman and Pelton 1980). Mollohan and LeCount found that in areas fragmented by sparse cover vegetation bears occupied larger territories. Home ranges for females in fragmented areas were 104 square kilometers (40 square miles) compared to unfragmented habitat where home ranges were only 40 square kilometers (15.5 square miles). Home ranges for males increased from 194 square kilometers (75 square miles) in unfragmented habitat to 609 square kilometers (235 square miles) in fragmented habitat. This project proposes to permanently reduce forage and cover by fuels management in DFPZ's and thinned areas and to further fragment the forest with group selections. For escape from sight, bears prefer dense short vegetation, one to six feet in height as hiding cover (Dusi et al. 1987, Mollohan and LeCount 1989). The adequacy of cover also influences the size of the bears home range (Rudis and Tansey 1995). A study by Cunningham (pers. comm. S. Cunningham, 2002) also showed that cover was the primary factor in habitat selection for black bears and that of all variables, shrub density was the most effective for predicting black bear presence. Mollohan and LeCount (1989) determined that bears would avoid open habitat where more than 10% of their bodies were visible at a mean distance of 28 meters. Horizontal	The cumulative effects consider habitat at both the District and Project Area level. As discussed in the FEIS, the project area has very little oak to provide acorn mast (FEIS, Chapter 3, Wildlife section). With the exception of the group selections, the project treatments do not result in sparse cover as referenced in the comment. Changes to canopy cover as well as declines in down wood (changes in forage value) were considered. Alternative 14, while not specifically developed for bear, would have a positive effect in retaining cover and down logs, important to a wide range of wildlife.

Comment #	Comment	Response
	cover measurements in thinned study plots in Lassen National Forest averaged 56% visibility at 160 meters. Studies of forest thinning in the Feather River Management Area of the Lassen National Forest by Preston (2002) concluded that ground cover regenerated slowly. This conclusion was confirmed in the DEIS. The addition of new roads proposed in the project further degrades habitat by increasing access into forested areas. The DEIS for the project proposes to create additional roads but to close some roads and decommission others. It has been my experience that once a road is created, road closures are generally ineffective. Gates are removed or destroyed or alternative entries around the gates are created. Thinning of forest stands also creates adequate openings for OHV access for hunting, poaching or woodcutting. (Preston 2002) In a study in a mixed conifer, ponderosa pine forest, Mollohan and LeCount (1989) showed that fragmentation threatened the viability of the population by increasing hunting and poaching of adult females, decreasing reproductive rates of bear populations. The cumulative elimination of cover forces bears to concentrate in smaller areas that retain cover. Females then cannot avoid males and cubs in this situation did not survive to yearling stage due to increased predation on cubs by male bears (pers. Comm. S. Cunningham, 2002) The Creeks project proposes to eliminate shrubs and small trees that provide cover. The DFPZ's will be maintained in this condition. Thinned areas are slow to regenerate (CFHRP-DEIS, Preston 2002). The loss of vertical stratification and forest cover fragments suitable habitat for black bears.	
31-9	There is no monitoring data available for black bear in the DEIS. Since 1992 there has been a directive on the Lassen N.F. to assess changes in habitat capability and population trends resulting from management activities (Lassen NF Forest Plan 5-29). Since 1992 the cumulative effect and changes in habitat from several forest harvest and treatment projects has been significant. Yet, since 1992 has been no compliance with the Forest Plan directive.	Population monitoring and trend assessment is done by California Department of Fish and Game. Habitat changes are considered at the project level analysis (FEIS, Chapter 3, Wildlife section).
31-10	Pileated Woodpecker -- The DEIS states that "there is no local data concerning population trends for this species... and effects can be estimated through the analysis of habitat characteristics in the project area". Population and distribution monitoring are required for this MIS species. This information has not been provided in the DEIS. Timber harvest has most significant impact on habitat. Removal of large-diameter live and dead trees, of downed woody material, and of canopy closure eliminates nest and roost sites, foraging habitat, and cover. Forest fragmentation likely reduces population density and makes birds more vulnerable to predation as they fly between forest fragments (Bull and Jackson 1995).	As per "Clarification Regarding MIS Analysis and Documentation in Project Level NEPA" dated 10/29/04 (PSW Region 5), "while MIS population data is useful in determining effects to MIS, it is not the only way to analyze impacts to these species. Current science confirms that other information, such as habitat conditions can be used as a sound scientific basis for assessing project impacts on species diversity, including MIS." For the Creeks MIS analysis, habitat and population information was gathered from several sources including local State Fish and Game biologists' local bird census, and Breeding Bird Surveys.
31-11	Although the DEIS states that there are few discernable cumulative effects from this project, the proposed project admittedly will increase fragmentation, open the canopy	Because of the broad interpretation, the term "fragmentation" was used in very specific contexts, and specific to the species being discussed. The FEIS does not

Comment #	Comment	Response
	and remove foraging habitat and cover [for pileated woodpeckers]. For this Lassen NF-Forest-wide MIS, the cumulative effects of other past, present and foreseeable future projects throughout the forest must be assessed in order to discern the full impact on the viability of this species. This was not done. Pileated woodpeckers may move to lower elevations out of the project area in winter (Bull and Jackson, 1995). In addition young leave parents in fall and wander until spring when they will nest if a territory is available and acquired. Movement outside the project area is likely and with increased fragmentation and degradation of the forest, habitat territories are likely to be reduced in availability. Timber harvest has most significant impact on habitat. Removal of large-diameter live and dead trees, of downed woody material, and of canopy closure eliminates nest and roost sites, foraging habitat, and cover (Bull and Jackson 1995). A forest-wide cumulative effect assessment must be conducted to assess the impact of these projects on the viability of this species. This cumulative impact was not addressed in the DEIS.	contend or imply that the project would increase fragmentation for the pileated woodpecker (FEIS, Chapter 3, Wildlife section). The analysis does recognize that foraging habitat and cover would be affected and habitat values would be affected but that does not constitute fragmentation as defined in the FEIS. As cited in the FEIS, Bull et al (2005) looked at the impacts of fuels treatment such as this and found that pileated woodpeckers foraged in stands with much lower basal areas than those proposed under either Alternative 1 or Alternative 14. While the habitat value may decline within treated stands, that does not constitute fragmentation as explained in the FEIS (FEIS, Chapter 3, Wildlife section). The cumulative impact of habitat loss by treatment type was considered in the FEIS (FEIS, Chapter 3, Wildlife section).
31-12	The DEIS [...] fails to address the type of snag that will be retained. Many species have preferences for size, aspect and spacing of snags. Arsenault (2003) reported that several studies found significant directional orientation selection of woodpecker cavities. Pileated woodpeckers utilize several cavities at a time. In a woodpecker cavity study it was found that each bird used an average of 7 (range = 4-11) different roost trees in a 3- to 10-mo period (Bull and Jackson 1995). Interspecific and intraspecific competition for nest and cavity sites may also influence nest site selection because tree cavities are a discrete resource. Old nest cavities may be used as roost sites but are rarely used for nesting again (Bull and Jackson 1995). Snags that are retained may not possess the specific requirement needs for these species. Since Pileated woodpeckers utilize green conifer forest, snags are not the only important habitat element for this MIS. These facts were not addressed. The cumulative impacts of projects in nearby forest areas that have eliminated habitat for dispersal of young or expansion of territory size due to habitat degradation must also be considered.	Appendix D in the FEIS provides the snag marking guidelines used for this analysis and should be considered with the snag integrated design features within the FEIS (Chapter 2). The snag marking guidelines stress the need to retain live trees with decadence attributes specifically to meet future snags but also retain those attributes that are generally lost during thinning.
31-13	The 1992 Lassen Forest Plan p. 5-30, directs the Forest Service to determine population and habitat trends [for the pileated woodpecker]. The 1999 Forest Plan Monitoring Report p. 71 states that no monitoring was done. There is no evidence in the Creeks DEIS supporting this requirement. Presence of these species has been detected in transect studies but population trends have not been determined as directed.	As per "Clarification Regarding MIS Analysis and Documentation in Project Level NEPA" dated 10/29/04 (PSW Region 5), "while MIS population data is useful in determining effects to MIS, it is not the only way to analyze impacts to these species. Current science confirms that other information, such as habitat conditions can be used as a sound scientific basis for assessing project impacts on species diversity, including MIS." For the Creeks MIS analysis, habitat and population information was gathered from several sources, including deer herd plans, local State Fish and Game biologists, and Breeding Bird Surveys.
31-14	Hairy Woodpecker -- Each species of woodpecker has many habitat requirements, only one of those requirements being the presence of snags. The impacts of this project on all the other habitat requirements for all life functions of these species (e.g.	The FEIS considered changes to a wide range of habitat conditions and considers a number of habitat condition changes (FEIS, Chapter 3, Wildlife section). The FEIS based the analysis on current habitat models including habitat suitability models

Comment #	Comment	Response
	feeding, dispersal of young) were not addressed. The DEIS fails to address all life function requirements for the Hairy Woodpecker. Instead the FS assumes that if the snag retention standard was met, viable populations of all woodpecker species would result. There is no discussion regarding the loss of vertical structure and the resulting impact on food, movement or cover sources for these species. According to the CDFG CWHRS Hairy Woodpecker uses relatively patchy stands of conifers with adjacent riparian habitat and abundant snags. Tree/shrub, tree/herbaceous, and shrub/herbaceous ecotones are important. These habitat types will be removed permanently in the DFPZ's and the thinned areas are not likely to support these ecotone elements. Although the cumulative effect of similar projects throughout the Lassen forest is likely to be substantial on this species they were not considered in the DEIS.	within the CWHR program. While there are other attributes that could be considered, the models described those that are critical. The FEIS also recognizes that there would be a number of areas left untreated that provide other habitat elements. Alternative 14 provides several areas where 10% of the stand would remain untreated specifically to provide for stand heterogeneity (FEIS, Chapter 2).
31-15	The DEIS [...] fails to address the type of snag that will be retained. Many species have preferences for size, aspect and spacing of snags. Arsenault (2003) reported that several studies found significant directional orientation selection of woodpecker cavities. Interspecific and intraspecific competition or nest sites and snag cavities may also influence snag selection because tree cavities are a discrete resource. Snags that are retained may not possess the specific requirement needs for these species. This was not addressed. The cumulative impacts of projects in nearby forest areas that have eliminated habitat for dispersal of young or expansion of territory size due to habitat degradation must also be considered. The assumption that retained snags will remain is invalid. Snags left in group selection cuts are also more vulnerable to windthrow and lightning than their counterparts within a forest (Jackson et al. 2002). The microclimate of snags in open areas is also changed. Exposure to sun may result in loss of moisture retention needed for fungal decay, which is associated with use for excavations by woodpeckers. In addition, the value of snags left in group selections for Hairy Woodpecker is questionable, as this species uses snags more often for perches and foraging and less often for nest sites.	The snag marking guidelines for the project are found within the FEIS (Appendix D) and supplement the integrated design features (FEIS, Chapter 2). Snag marking guidelines take into consideration retention of snags that would last the longest and generally have the most use. The current knowledge of snag use by wildlife does not allow a prediction of which snag would be used over another of seemingly same value. The intent of the guidelines is to preserve the largest snags and those species of snags that are least represented. No assumption is made that snags would remain in group selections. Snags would be retained where they do not compromise safety or if they are greater than 30" dbh. If snags can be retained within the group and would not compromise the intent of the group then they would be retained. However, snags specifically for wildlife would not be retained within group selections.
31-17	The DEIS [...] failed to address the cumulative impact of past and future forest thinning and canopy opening on predation of this group [hairy woodpeckers]. Open canopies and loss of forest cover increase visibility and accessibility to predators.	Based on habitat models presented in the FEIS and the CWHR program, hairy woodpeckers show a marked preference for stands that have sparse or open canopies (FEIS, Chapter 3, Wildlife section). There was no data found that discusses the rate of predation. It is presumed that by providing better habitat, local increases in the number of hairy woodpecker would occur. There is no data that supports the contention that hairy woodpecker are more numerous in denser stands as a means to avoid predation. The cumulative effects section addresses changes within the project area and the overall impact to the species (FEIS, Chapter 3, Wildlife section).
31-18	Although monitoring information was mentioned briefly in the general introduction of	Monitoring for selected MIS is completed at the Forest level. Please refer to the

Comment #	Comment	Response
	MIS species, the monitoring data, reports or summaries [for hairy woodpeckers] were not included in the DEIS. The 1998 Forest Plan Monitoring and Evaluation Report, citing Forest Plan requirements, directs the Forest Service to determine population and habitat trends for this species. Presence of these species has been detected in transect studies but population trends have not been determined as directed.	response to comment 31-10 for the use of habitat as a means to determine effects to wildlife species and MIS in particular.
31-19	Gray Squirrel -- In the DEIS area there is no discussion of Gray Squirrel. . This species was not considered as applicable to the project area because, as stated "there is limited habitat for this species within the project area." Gray Squirrels are found in the project area and consistently throughout many areas of Lassen National Forest, including areas without a strong oak component (personal observation, Preston). The Gray Squirrel is a Lassen National Forest MIS. Since 1992 there has been a directive on the Lassen N.F. to determine population and habitat trends for the Gray Squirrel (Forest Plan p. 5-29). Compliance with the 1992 Forest Plan would have provided information regarding habitat use and population trends of this species. The Creeks DEIS-MIS analysis is flawed by failing to consider the gray squirrel in the environmental analysis since it will be directly, indirectly and cumulatively affected by this project.	The area is dominated by red fir and red and white fir communities. Based on habitat suitability indices (CWHR program), less than 50% of the project area provides even medium habitat capability. Red fir is not considered to be suitable and oak woodlands are generally recognized as a preferred habitat attribute. Oak is largely absent in the project area as noted in the FEIS (FEIS, Chapter 3, Wildlife section). To be considered an appropriate MIS, the habitat must be such that changes in habitat can be used to predict impacts to the species and the guild they may represent. Because the habitat is limited, the gray squirrel makes a very poor MIS species for the project area and, therefore, was not included.
31-20	Bald Eagles and Osprey were not considered in the DEIS because as stated "...the project area lacks the aquatic needs of this species or because the project area lacks the lakes and large rivers preferred by these species. Both species occur within the project area and throughout many areas in the Lassen National forest. Both species use creek areas for hunting and can be observed on a regular basis using these creek systems in the Lassen National Forest watershed area as potential food sources (personal observation, Preston). No monitoring information was provided for these species in the DEIS. No cumulative impact of loss of hunting area from projects throughout the forest was discussed. The reproductive success of these species is dependent on the many factors, including adequate food sources. Ensuring successful reproductive success is a 1992 objective of the Lassen National Forest, Forest Plan. If these species are utilizing smaller water bodies for a source of food then these foraging areas are essential in maintaining viability of these species. Cumulative effects and monitoring of populations should have been conducted and the data provided in the DEIS.	As stated in the FEIS there are no known occurrences of nests or suitable foraging habitat for these species within several miles of the Creeks Project area (FEIS, Chapter 3, Wildlife section). The project area does not contain the large fish-bearing lakes and rivers required by these species. There are nesting osprey and bald eagles at Lake Almanor, which is outside the area of consideration of analysis for the Creeks Project area.
31-21	Additional Species of Importance [besides mule deer, black bear, pileated woodpecker, gray squirrel, bald eagle, and osprey] - Additional species are discussed at the end of the MIS section. The DEIS states that many of these species are positively correlated to shrub cover. Shrub cover will be eliminated by thinning treatments and permanently eliminated in the DFPZ areas. These areas have some of the highest quality habitat for neo-tropical and ground nesting species. The cumulative effect to shrub dependent and ground nesting species from this project	We recognize that there would be some shrub reduction and agree that there would be impacts to migratory landbirds. However, reduction in shrub cover is likely to occur over time regardless of the actions taken in the action alternatives due to the increase in tree densities, as discussed in the direct and indirect effects of the No Action Alternative and the vegetative cumulative effects section (FEIS, Chapter 3, Wildlife section). Shrub and edge habitat, which can improve species richness and diversity, is expected to increase across the landscape with the implementation of

Comment #	Comment	Response
	and other projects within the forest was not addressed. Many of these species are known to be in decline based upon ongoing monitoring (PRBO, Partners in Flight program)	group selections. The FEIS also recognizes that the increases in conifer densities and maintenance are cumulative effects that may affect shrub retention over time.
31-22	The Edge Effect -- The Creeks project proposes a number of silvicultural treatments that will create significant edge effects within the project area. Group selections create small islands with edges. Edges have been found to be detrimental to many wildlife species (Noss 1983). Songbirds nesting near edges were found to suffer higher predation and parasitism than forest interior species (Gates and Gysel 1978). Brown-headed cowbirds were detected over 200 meters from the forest edge in an area moderately mechanically thinned stand of conifers on the Lassen National Forest at 5 of 10 stations in a point count conducted in 2003 (Preston, personal observation). Similar studies have found that brood parasitism occurred from 100-600 meters into the forest (Brittingham and Temple 1983, Wilcove et al. 1986). Forest fragmentation has been implicated as a cause of population declines of several neotropical species. Fragmentation increases the amount of habitat edge and reduced nesting success rates near the forest edges. Distance to the nearest clearcut edge was the best predictor of nest failure. (Manolis et al. 2002). The edge effect will likely affect several species, primarily the neo-tropical species. The impact of edge effect on various MIS and neotropical bird species was not discussed in the DEIS.	Edges are extremely valuable habitat for a wide variety of species. Bird monitoring completed on the Almanor Ranger District has repeatedly shown that edge habitat is a highly productive area particularly in shrub fields and meadow habitats. Aspen enhancement monitoring on the Eagle Lake District found that cowbird numbers were very low with no difference between treated stands and untreated stands. Brown-headed cowbirds are an uncommon species on the Almanor Ranger District. Two banding stations with associated point count stations have been conducted annually by Point Reyes Bird Observatory since 1997. During those eight years, no cowbirds were banded, no cowbird young were ever detected, and adult cowbirds were detected in point count stations only twice.
31-24	The LNF Forest Plan and FSM (2620) require management indicator species to be identified, monitored and viable populations maintained. The LNF Plan identified monitoring requirements at the Forest level (1992 LNF Forest Plan, Chapter 5) and indicates that several LNF management indicator species assessed in the Creeks DIES require annual monitoring. No meaningful LNF monitoring data appears in the DEIS or MIS report therefore the Lassen National Forest cannot support its speculative conclusions regarding the trends of specific MIS in the Creeks project.	Please see response to comment 31-10.
31-25	The Creeks Project DEIS fails to adequately assess the cumulative impacts to the Lassen National Forest (LNF) MIS. [...] The possibility of cumulative impacts to MIS from the cited project is incomplete or totally lacking. The Forest Service DEIS/MIS analysis fails to mention and assess several other projects proposed or decided on the LNF that will impact forest-wide MIS cumulatively such as the Jonesville and North Dusty project which contain no MIS in their EAs. Many of the MIS identified in the Forest Plan and the Creeks project move throughout the Lassen National Forest and are therefore potentially affected by a variety of cumulative impacts across the forest, not just limited to the Lassen project area. As mentioned above, Mule and Black tail deer migrate from winter to summer range, and fawning areas through migration corridors. These various habitat elements are not all confined to the Lassen project area. The Lassen DEIS/MIS	Both the Jonesville (2000 and 2004) and North Dusty decisions were based on a wildlife report that was incorporated by reference into the respective NEPA documents. Cumulative Effects are considered when there is a link to the direct or indirect effects. The FEIS quantifies the amount of habitat at the District level and relates that to the effects from the project (FEIS, Chapter 3, Wildlife section). Wildlife home ranges may be large, such as bear, but individuals do not range throughout the Lassen National Forest except perhaps during migration such as deer moving from lower elevations to summer areas. Deer typically return to the same summer area and do not wander over large areas once they reach their preferred summer grounds. The MIS analysis considers changes in habitat and the effect on the species, not individuals per se (FEIS, Chapter 3, Wildlife section).

Comment #	Comment	Response
	analysis is flawed because the impact assessment focuses upon the analysis area and not the specific MIS identified in the project/forest plan. The cumulative effects analysis lacks necessary habitat and population data for several forest-wide MIS cited above. The spatial scale of the impact assessment is inappropriately focused on the analysis area and not on the species that migrate, disperse and complete various life-cycle functions outside the analysis area. The Forest Service can not treat the analysis area like a fence which limits MIS movement. Such a notion is contrary to sound science and existing law.	
31-26	The H-F QLG program of work of work is a reasonably foreseeable future action with significant cumulative impacts on a variety of wildlife including the LNF MIS. The 1999 QLG FEIS section AA-18 identifies changes in habitat values for MIS in the pilot project area. Although there was no baseline habitat assessment or population/habitat monitoring to support the conclusions for MIS in the QLG FEIS, there are certainly some alarming habitat impacts to MIS from the QLG pilot project as currently implemented. In fact, the logging-related impacts are worse then depicted in the 1999 QLG assessment since there currently are no canopy requirements in the 2004 ROD for DFPZs in class 4 strata. In the 1999 HF-QLG FEIS Gray Squirrel is expected to see a 45% reduction in habitat due to group selection logging and a 9% reduction in habitat due to DFPZ construction. Pileated Woodpecker is expected to see a 35% reduction in habitat due to group selection and a 23% reduction due to DFPZ construction. These facts should have been discussed and analyzed as part of the MIS-cumulative effects determination section of the Creeks DEIS. The QLG Program of Work is listed on the Forest Service/QLG website: http://www.fs.fed.us/r5/hfqlg/impplan/implement/imp plan 06 2004 files/FY05 FY09 implementati on_plan.pdf. This 18 page list identifies 5 years of proposed actions by location, sawlog volume and acres-treated and is a reasonably foreseeable future action under NEPA. The Creeks DEIS and MIS report fails to assess the cumulative impacts from the pilot project to forest plan MIS which migrate through, disperse young, and utilize habitat within and outside the project area. The MIS analysis is flawed for not considering the forest plan level cumulative impacts while utilizing forest plan level indicators and for failing to assess impacts from the HFQLG Pilot Project program of work.	As outlined in the response to comment 31-19, the Grey Squirrel is not retained as an MIS for this project due to the low value of habitat. The impacts to the Pileated Woodpecker is addressed in Chapter 3 of the FEIS. The HFQLG FEIS states that the habitat value for pileated woodpecker may be reduced but the pilot project area would retain moderate habitat capability for this species. The amount of habitat at the District level was used as a comparison to show the overall impact to habitat.
31-27	The Lassen DEIS fails to meet forest plan requirements for the protection of MIS in the revised 2004 SNFPA ROD. The 2004 Sierra Nevada Forest Plan Amendment (SNFPA) Final Supplemental Environmental Impact Statement (FSEIS) and Record of Decision (ROD) incorporate Appendix E from the 2001 SNFPA ROD/FEIS into the current forest plans (2004 SNFPA ROD p. 70). The 2004 SNFPA FSEIS Monitoring Section-Appendix E (pages E-64,76,98) addresses these requirements for annual population trend monitoring for	The 2004 SNFPA ROD did not amend the Lassen NF list of MIS species. There is no direction to analyze the effects of actions to species identified as SAR.

Comment #	Comment	Response
	a variety of MIS and Species At Risk (SAR). The SNFPA Monitoring Section identifies MIS and SAR where population tracking and monitoring of population trend is "expected annually" SNFPA FEIS, Vol. 4, Appendix E-62-64 Table E9; E-75-77 Table E-10; E-96-100 Table El 1.	
31-29	The Creeks DEIS and MIS Report fail to mention or address impacts to the expanded MIS/S ARs list in 2001 SNFPA/Volume 4, Appendix-E which is part of the Forest Service management responsibility under the 2004 SNFPA ROD. There is no evidence in the record showing the region, forest or district has met this SNFPA forest plan requirement since 2001. The Creeks DEIS/MIS analysis lacks necessary data to support a positive trend determination for MIS/SAR in the amended 2004 SNFPA and ROD. The national forests must follow their regional and local forest plan requirements to be consistent with applicable Federal laws as required by the HF QLG Act.	Neither the 2001 SNFPA ROD nor the 2004 SNFPA ROD amended the Lassen National Forest list of MIS. There is neither direction nor requirement to analyze the impacts to SAR.
31-30	I have reviewed the 1998 Lassen National Forest, Forest Plan Monitoring Report (July 1999). I believe it is the last Monitoring report completed on the Lassen. --Current status of Deer show a 60% decline from 1992 to 1998 Monitoring Plan p.64. This alarming decline is attributable to several factors including timber management activities that reduce deer habitat (Monitoring Plan p. 70) -The 1992 Forest Plan p. 4-37 Section d. (1) and (2) and the 1998 LNF Monitoring Plan p. 68 direct the LNF to maintain summer range to provide at least 20 percent forage and 20 percent thermal cover in 500 to 1,000 acre blocks. There is no indication in the Creeks DEIS that the Forest Service is meeting this standard nor is there any discussion of impacts to the summer range in the cumulative effects section.	The monitoring plan includes data from 6 separate deer herds. The dramatic decline was due to heavy winter snows that caused mortality in the east side herds. Decline data is presented in the FEIS for the East Tehama Deer Herd, which utilizes the project area. That requirement is discussed in the FEIS and the lack of foraging habitat is the limiting factor not hiding or thermal cover (FEIS, Chapter 3, Wildlife section). The monitoring plan does not conclude that timber management is responsible for declines in deer herds, or that the change in direction has reduced the amount of quality forage.
31-31	—the 1998 LNF Monitoring Report p. 67 commits to "determining the population trends" for Black Bear, Deer, Western Gray Squirrel and Hairy and Pileated Woodpeckers. There is no evidence the Forest Service has developed population trend data as required by NFMA and your 1992 Forest Plan and including the 2004 Framework amendment, Appendix E.	Please see response to comments numbers 31-10, 31-27 and 31-29.
31-32	An adequate MIS cumulative effects analysis for forest-wide MIS requires that the LNF gather forest-wide data to support your findings regarding population impacts, as identified in your forest plan. In recent projects on the Almanor Ranger District—North Dusty (1998) and Jonesville (1999)~the environmental assessment MIS analysis is completely absent, contrary to existing law. There may be other recent projects with similar flaws. To adequately assess the impacts to MIS identified in your forest plan, the Almanor Ranger District must carry out a quantified cumulative effects assessment with	Please see Response to Comments #31-10, 31-27 and 31-29.

Comment #	Comment	Response
	monitoring data that can support a legally valid finding for MIS viability. The assessment should address the impacts from recent past project identified in the Creeks DEIS p. 248 and some general analysis of the projects you have identified on p. 246. Just presenting a map of the areas of disturbance from past activities 1975-2005 tells the public little about the actual effects of these projects on MIS and at-risk species.	
32-2	The Creeks project proposes intensive and widespread logging within an ecologically significant area and will adversely affect the area's environmental values, particularly habitat for old forest .associated species such as the California spotted owl and American marten. The project proposes to log 10,435 acres, including 5,905 acres of DFPZs, 3,285 acres of thinning, and 1,245 acres of group selection. (DEIS, p. 12). Most of the proposed logging will degrade or eliminate suitable habitat for old forest associated species. The DEIS fails to disclose the ecological significance of the project area and the extent to which the Creeks project will degrade those values, as required by NEPA. GIS analysis by Britting (2005) reveals that proposed logging overlaps with areas determined by the Forest Service and others to be ecologically sensitive, including old forest emphasis areas (OFEAs), areas of concern (AOCs) for the California spotted owl, owl home range core areas (HRCAs), and a habitat network for forest carnivores. The DEIS does not mention that the project would log within the OFEAs established by the 2001 and 2004 Framework, but Britting's analysis shows that approximately 8,828 acres of OFEA would be logged.	The FEIS includes an analysis of impacts to habitat of California spotted owl and American marten (FEIS, Chapter 3, Wildlife section). The AOC map used by Britting (2005) was generated as a planning map for the 2001 SNFPA and as such was a bioregional mapping exercise that had not been verified. The FEIS considered the Area of Concern to be north and east of the project area using the definition provided in Verner et al (1990). However, because there was concern that the impacts might indeed reduce the overall value within federal lands adjacent to the AOC, the area was incorporated into Alternative 14. The majority of the DFPZ in the AOC would be treated with a prescription that retains at least 40% canopy cover and includes retention of 10% of the stand as untreated area. The prescription also increases the amount of down woody material (FEIS, Chapter 2). See also response to comment 32-3 Old Forest Emphasis Areas are not part of the direction for areas under the HFQLG Pilot Project Area.
32-3	The DEIS states that the project area is "generally south of an area of concern" for the [spotted] owl. (DEIS, p. 110). In fact, based on the Forest Service's own GIS data, the Creeks project would log approximately 551 acres of AOC 2. (Britting 2005). This area of concern includes "a gap in known distribution" for the owl that "extends east-west in a band almost fully across the width of the owl's range." (Verner et al. 1992, p. 48). Thus, logging within this area could exacerbate concerns regarding the owl's distribution and the connectivity of habitat, yet the DEIS fails to disclose logging within the AOC, contrary to NEPA. See 40 C.F.R. § 1500.1(b)(EIS must include "accurate scientific analysis" and "high quality" information).	The Forest Service utilized GIS to map potential Areas of Concern (AOC) based on Verner et al. (1992) for the 2001 Sierra Nevada Forest Plan Amendment. However these maps were not ground truthed or otherwise verified for accuracy. Nor were the maps used to develop specific management guidelines related to AOCs. The overlap of the AOC with the Creeks project was reviewed and found not to meet the intent of the AOC as outlined within the FEIS (FEIS, Chapter 3, Wildlife section). Please see response to comments 32-2 and 32-3. Background information developed to analyze impacts to the mapped AOC #2 indicates that a portion of the mapped AOC is within an existing owl territory (PL160). Based on the AOC mapping there is approximately 1,539 acres of federal land within the Creeks project area that is within the mapped AOC. Of that 1,198 (78%) is considered suitable habitat. Based on Verner's description, the area would not meet the criteria for being included into the AOC. The project includes 35 acres of suitable habitat within that area that would be reduced to unsuitable within the mapped AOC due to implementation of group selections. An additional 307 acres of suitable owl habitat would become unsuitable or marginally suitable with the implementation of

Comment #	Comment	Response
		DFPZ prescription B. This results in approximately 29% of the suitable habitat within that mapped area becoming unsuitable or only marginally suitable. However, that would not result in the area as a whole contributing to bottleneck conditions or add to existing habitat gaps. Because of the concern that the impacts might indeed reduce the overall value within federal lands adjacent to the AOC, the area was incorporated into Alternative 14 (FEIS, Chapter 2 and Chapter 3, Wildlife section). The majority of the DFPZ in the AOC would be treated with a prescription that retains at least 40% canopy cover and includes retention of 10% of the stand as untreated area. The prescription also increases the amount of down woody material.
32-4	The DEIS [...] fails to emphasize that the Creeks project will log a substantial amount of the habitat management areas set aside in the Lassen LRMP to protect forest carnivores such as the American marten and Pacific fisher. According to the forest plan, one purpose for establishing the network was "to provide breeding areas and travel corridors to facilitate movement of individuals and genetic exchange throughout the length of the Forest." (Lassen National Forest 1992a, p. T-l). These areas "are important to maintaining landscape level connectivity from north to south in a region where habitat quality is presently fragmented and of marginal quality." (Britting 2005). The Creeks project will log approximately 624 acres of the Lassen furbearer network. (Britting 2005). As stated in the Lassen LRMP, "there is no research data or other empirical evidence to suggest that we can harvest within furbearer areas and still maintain suitable habitat conditions." (Lassen National Forest 1992a, p. T-2). Despite this concern, the Creeks DEIS fails to disclose or analyze the impacts to the forest carnivore network and its habitat values, contrary to NEPA. (Although the forest carnivore network is no longer a land allocation under the 2004 ROD, the ecological and habitat values that were recognized by the Forest Service in designating the network must still be recognized and analyzed in the EIS.)	The network of forest carnivore territories and corridors established in the Lassen NF LRMP are no longer recognized land allocations as per the 2004 SNFPA ROD. In lieu of this network, the 2004 SNFPA ROD established consistent standards and guidelines that were deemed sufficient to maintain marten and fisher viability within the Region. Although the Creeks FEIS does not analyze effects to these abandoned land allocations, the FEIS does disclose effects to marten habitat and determined that the proposed activities within Creeks may affect marten individuals, but are not likely to result in a trend towards federal listing or loss of species viability (FEIS, Chapter 3, Wildlife section). Potential effects to connectivity and habitat fragmentation for marten were analyzed and disclosed within Chapter 3 of the FEIS. Because the DFPZs were seen to lower the value of the connective habitat, Alternative 14 was developed that placed treatments retaining higher canopy cover and a higher level of down logs within areas considered key to maintaining effective connectivity. Additionally, the new prescription retains 10% of the stand as untreated areas to provide additional cover within the DFPZ (FEIS, Chapter 2).
32-7	The DEIS [...] fails to take a hard look at the project's likely impacts, including cumulative impacts of past and proposed timber sales and impacts on California spotted owl habitat. For these and other reasons detailed below, the Creeks DEIS fails to comply with applicable laws and should be revised and circulated for additional public comment.	The FEIS reviews the impacts of past actions in terms of the prescriptions used, and the relative impact to key habitat attributes (FEIS, Chapter 3, Wildlife section).
32-8	The Creeks project fails to comply with the National Forest Management Act (NFMA) and the applicable forest plans, for the following reasons. The Creeks Project Threatens the Viability of the California Spotted Owl The California spotted owl is threatened with extinction and requires protection under the Endangered Species Act. The Campaign and other groups have petitioned the U.S. Fish and Wildlife Service to protect the owl under the ESA. (Center for	The cumulative effects of fully implementing HFQLG pilot project was modeled, analyzed and displayed in the 2004 SNFPA FSEIS. This analysis documented cumulative effects to habitat across the entire Sierra Nevada range, including the HFQLG pilot project area. This analysis formed the basis for the determination on owl viability across the entire Sierra Nevada range. The Creeks project site specific cumulative effects were based on a 32,570 acre project area. This project treatment

Comment #	Comment	Response
	Biological Diversity et al. 2004). The Fish and Wildlife Service recently issued a positive 90-day finding that the petition presents substantial information indicating that listing may be warranted. 70 Fed. Reg. 35607 (June 21, 2005). The 2004 ROD will result in substantial loss and degradation of habitat for the California spotted owl by allowing harvest of medium and large trees, reduction in canopy cover, and removal of large snags and down logs. The leading owl biologists who have reviewed the 2004 Framework have uniformly concluded that the new plan threatens the owl's viability throughout the Sierra Nevada and contributes to a trend towards federal listing. (These reviews are included as part of the Campaign's appeal of the 2004 ROD, which we have previously submitted to the Forest Service and which we hereby incorporate by reference into these comments.) [...] Because the Creeks project implements the 2004 ROD, it contributes to the risk to the owl's viability and to the need for listing the owl under the Endangered Species Act. There is substantial cause for concern regarding the owl's status, particularly in the northern Sierra Nevada where the demographic studies strongly suggest a declining population trend. [...] The Forest Service prepared an EIS and biological assessment/biological evaluation (BA/BE) to analyze the impacts of implementing the QLG project, which found that the QLG project would significantly degrade owl habitat. (USDA Forest Service 1999b). Of all the alternatives considered, full implementation of the QLG project posed the greatest overall risks to the spotted owl. (USDA Forest Service 1999a, p. 82). [...] The BA/BE therefore recommended that "no timber harvesting ... be permitted in suitable owl habitat unless and until a new owl strategy for the Sierra Nevada is released." The U.S. Fish and Wildlife Service reviewed the QLG project in response to the Forest Service's request for comments and consultation. (USDI Fish and Wildlife Service 1999). The Fish and Wildlife Service expressed concerns "that the proposed action will negatively affect spotted owl survival and/or reproduction for the following reasons: (1) habitat loss, (2) habitat fragmentation, and (3) changes in prey base." [...]The Record of Decision approving the QLG project reiterated these concerns about owl viability and adopted the mitigation measure recommended in the BA/BE. Specifically, the ROD found that fully implementing the QLG project "could pose a serious risk to the viability of the California spotted owl in the planning area." (USDA Forest Service 1999c). The Forest Service reconsidered the impacts of fully implementing the QLG project during the process of adopting the Sierra Nevada Framework. The Forest Service again concluded that fully implementing the QLG project would significantly increase the risks to the owl, compared to the Framework alternative. [...] Regional Forester Brad Powell, in the Framework ROD, stated his intention "to carry out as much of the [QLG] pilot project as possible." (USDA Forest Service 200 Ib, p. 50). However, he concluded that "the entire level of management activity specified in the HFQLG	area plus an additional larger land base (owl territory) was used to determine the potential direct, indirect and cumulative effects on spotted owl (FEIS, Chapter 3, Wildlife section). The project analysis, including the cumulative effects, recognizes there are a great many unknowns and some associated risks with implementing the Creeks project (FEIS, Chapter 3, Wildlife section). The findings in the HFQLG FEIS Biological Evaluation were based on the demography data showing that spotted owl populations had declined 7% - 9% per year within the individual demography studies. The declines were based on statistical bias that was corrected in the draft meta-analysis and utilized in the development of the 2004 SNFPA FSEIS. The FEIS fully recognizes and addresses the differing scientific opinions on the impacts that fuels treatments can have on owls (FEIS, Chapter 3, Wildlife section).

Comment #	Comment	Response
	legislation cannot be implemented without degrading owl habitat without increasing risk to owl viability. The provisions for excessive canopy closure reductions, large tree removals, and substantial acreages in group selection treatments are factors contributing to this conclusion." (USDA Forest Service 200Ib, p. 51). The owl biologists have consistently expressed serious concerns about fully implementing the QLG project.	
32-9	The Creeks project poses a particular threat to the owl because of the large amount of logging within owl territories and HRCAs. According to the DEIS (p. 112), the Creeks project would render unsuitable approximately 3,716 acres of owl habitat. Moreover, the percentage of existing suitable habitat that will be rendered unsuitable is substantial in some owl territories; for example, 26 percent of existing suitable habitat will be rendered unsuitable in PL121, 15 percent in PL215, and 13 percent in PL048. The DEIS (p. 109) assumes that only 1,000 acres of suitable habitat is required for a given owl territory to remain viable. However, this figure is significantly too low, based on the best available research and past Forest Service analysis. During the QLG EIS process, the Forest Service undertook a home range analysis to assess potential impacts on owl home ranges. The analysis assumed, based on research by Bart (1995), that 50 percent suitable habitat represented a threshold value, and that home ranges with less than 50 percent suitable habitat would be less likely to support owl pairs. (USDA Forest Service 1999a, p. 83). Based on a home range size of 4,500 acres on the Almanor Ranger District (DEIS, p. 109), each home range should include 2,250 acres of suitable habitat to meet this threshold level. The analysis in the DEIS shows that most owl territories currently lack 2,250 acres of suitable habitat, and only 3 of 19 territories will include 2,250 acres of suitable habitat after the Creeks project is implemented. (DEIS, p. 112). Moreover, the effect of implementing the Creeks project will be to reduce the amount of suitable habitat within 5 of the 19 territories from greater than 2,250 acres to less than 2,250 acres. (Ibid.). Therefore, based on the Forest Service's own analysis in the QLG EIS process, there is serious cause for concern regarding lack of suitable habitat in owl territories, and the Creeks project will exacerbate this problem. Blakesley's research on the Almanor Ranger District, including the Creeks Project area, found that the composition of 2010 acre Core Areas averaged 32% in CWHR 5D and 5M, plus 45% in 4D and 4M. (Blakesley 2005, p. 3). This amounts to an average of nearly 1550 acres of "suitable" spotted owl habitat immediately surrounding spotted owl territory centers, which is significantly more than the 1,000 acres that the Creeks DEIS claims is sufficient for the entire territory.	The FEIS does not assume that 1,000 acres is the minimum amount needed for territory viability (FEIS, Chapter 3, Wildlife section). As outlined in the FEIS the reference to the 1,000 acres of suitable habitat reflects direction of the 2004 SNFPA ROD outside of the HFQLG pilot project area. The 1,000 acres represents the acres presented in the SNFPA as the mapped area of the bio-regional owl management strategy that will become direction within the Creeks Project Area at the end of the HFQLG Pilot Project. The FEIS analyzes impacts to both the territory and the nest core area. The FEIS also outlines the impacts to HRCAs (FEIS, Chapter 3, Wildlife section). The selection of either Alternative 1 or Alternative 14 would result in a reduction approximately 8 - 10% of the available suitable habitat. Additionally there is approximately 2,500 acres of CWHR 3P, 3M, and 3D within the project area, much of which would develop suitable habitat attributes over the next decade. Given the amount of existing suitable habitat and the amount that would develop, the impact to the amount of foraging habitat when considered at the landscape level, is relatively minor. However, to place that into context, the actual number of territories affected was considered in the FEIS as well as the relative amount of habitat remaining within each territory and across the landscape, commensurate with the effects of the alternative analyzed (FEIS, Chapter 3, Wildlife section).
32-10	there is substantial evidence that logging within owl home ranges, and particularly within owl home range core areas (HRCAs),4 can contribute to reduced survival, reduced fecundity, and other adverse effects on the owl. Blakesley's research within	Blakesley's work has provided much local information which was incorporated into the analysis of effects for this project (FEIS, Chapter 3, Wildlife section).

Comment #	Comment	Response
	the Creeks project area showed that owl survival increased as the amount of suitable habitat increased within 500 acres and 2010 acres of the owl activity center, and that "both spotted owl site occupancy and reproductive output decreased with increasing amounts of non-habitat within 500 acre areas around site centers." (Blakesley 2005, p. 3). Blakesley also specifically examined the owl's status within many of the territories in the Creeks project area. She found that several owl territories became vacant following logging on Forest Service and private lands, and that "these cases provide evidence that habitat loss outside of PACs is associated with reduced numbers of spotted owls within the Creeks Project area." (Blakesley 2005, p. 2).Given the size of owl home ranges and the proximity of proposed logging to owl PACs, Dr. Blakesley estimates that "the loss and degradation of foraging habitat would be likely to impact most, if not all, of the spotted owls in the planning area." (Blakesley 2005, p. 5). As Dr. Blakesley concludes, "it would be irresponsible to knowingly degrade and remove spotted owl habitat in the name of 'Forest Health Recovery' when viable alternatives exist for restoring forest stands to pre-fire suppression conditions."	
32-11	Full implementation of the QLG project pursuant to the 2004 ROD would threaten the viability of the California spotted owl, and implementing the Creeks project as currently designed would contribute to this risk, contrary to law.	The 2004 SNFPA considered the impacts of implementing the HFQLG FEIS and the Biological Evaluation determined that it would not lead to a loss of viability for the California spotted owl.
32-12	By nature a relatively uncommon species, American martens are inherently vulnerable to local extirpation and extinction for several reasons, as noted in the Sierra Nevada Framework EIS (USDA Forest Service 2001a, Vol. 3, Chap. 3, part 4.4, pp. 22-23). First, martens have low reproductive potential; second, they have an affinity for dense overhead cover and tend to avoid forest openings; and third, martens have very large home ranges relative to their body size. Thus, as Dr. Kucera concludes, "habitat changes that would alter the marten's preferred habitat, such as the changes that would result from the Creeks Project, could reduce the marten's range and distribution, lead to local extirpation, delay reestablishment after extirpation, and further isolate the marten population to the south from those in the north." (Kucera 2005, p. 2). Particularly on the west slope of the Sierra Nevada, where the Creeks project is located, martens are closely associated with dense canopy forests. In general, martens prefer dense forests with canopy cover of 70 percent or greater and avoid relatively open forests with canopy cover of 40 percent or less. Martens are also known to avoid fragmented forest, that is, forest with many open areas. Overall, the Creeks Project proposes to treat approximately 10,435 acres, much of which currently supports marten. (DEIS p. 120; Figure 3-3). Table 3-30 of the DEIS states that the Project will render unsuitable 2,656 acres of moderate and high-quality marten habitat. This includes 1,245 acres of group selection, which will add to the existing openings in the project area. As acknowledged in the DEIS (pp. 129,	The analysis within the Creeks FEIS discloses effects to marten habitat, connectivity and potential reduction in marten populations within the project area (FEIS, Chapter 3, Wildlife section). However, while the analysis discloses impacts to habitat quality and affects to connectivity, the determination within the FEIS of the degree of effects differs from the personal opinion of the commenter and Dr. Kucera. The determination within Creeks FEIS for marten was that the proposed activities within Creeks may affect marten individuals, but are not likely to result in a trend towards federal listing or loss of species viability.

Comment #	Comment	Response
	131), this habitat reduction and fragmentation make it likely that the Creeks project will reduce the marten population.	
32-13	The proposed habitat loss and fragmentation will further reduce or eliminate north-south habitat connectivity between the Plumas and Lassen National Forests, thus further isolating marten populations to the north and south. (DEIS, pp. 126-130). This is a particular concern because the private lands to the east of the project area have apparently been heavily logged in the aftermath of the Storrie fire (DEIS, p. 241; Lassen National Forest 2002, p. 118 ("the private lands ... that were harvested will remain unsuitable (for forest carnivores) for several decades due to the removal of the majority of material")). As the Forest Service acknowledged in the Storrie EA, the Storrie fire severely impacted portions of the forest carnivore network and habitat corridors, which "increases the importance of maintaining remaining corridors and linkages between large areas of suitable habitat." (Lassen National Forest 2002, pp. 95-96). Therefore, as Dr. Kucera concludes, "the cumulative effect of the Creeks project together with recent logging on private lands could be to eliminate habitat connectivity and discourage marten north-south movement." (Kucera 2005, p. 4). These concerns about habitat connectivity are exacerbated by the proposal to log intensively within the habitat management areas that were set aside to protect forest carnivores like the American marten. According to analysis by Britting (2005), the Creeks project will log 624 acres of the forest carnivore network, including 532 acres that will likely be rendered marginal or unsuitable as marten habitat. According to the forest plan, one purpose for establishing the network was "to provide breeding areas and travel corridors to facilitate movement of individuals and genetic exchange throughout the length of the Forest" (Lassen National Forest 1992a, p. T-l). The forest plan set these areas aside from scheduled logging based on the fact that the Lassen has "limited suitable furbearer habitat," that "existing habitat is being fragmented by continued logging," and that "there is no research data or other empirical evidence to suggest that we can harvest within furbearer areas and still maintain suitable habitat conditions" (Lassen National Forest 1992a, p. T-2). According to Dr. Kucera, "there is no new scientific information that would change these conclusions." (Kucera 2005, p. 4). Therefore, as Kucera concluded, "based on the Forest Service's own findings, the proposal to log within the forest carnivore network is likely to further disrupt habitat connectivity, degrade existing habitat, and increase the risk that the marten population will become isolated or extirpated." (Ibid.).	The Creeks analysis discloses effects to habitat connectivity for marten (FEIS, Chapter 3, Wildlife section). The analysis concludes the treatments would reduce canopy cover in some areas to 30%, which, as disclosed, is at the lower end of suitability. However, literature cited in the DEIS and FEIS (Thompson and Harestad 1994, and Takats et al. 1999) support the analysis that stands with >30% canopy would be sufficient to allow travel of marten through the treated areas. Also, RHCA buffers in the south end of the project were established to provide a linkage and connectivity to higher quality habitat to the north. Therefore, while the analysis discloses impacts to habitat quality and affects to connectivity, the conclusion is that the project would provide for the movement of marten. Because connectivity is a concern, Alternative 14 was developed (FEIS, Chapter 2) to address connectivity in key areas providing linkages to large areas of suitable habitat. Please refer to comment 16-1. The network of forest carnivore territories and corridors established in the Lassen NF LRMP are no longer recognized land allocations as per the 2004 SNFPA ROD. In lieu of this network, the 2004 SNFPA ROD established consistent standards and guidelines that were deemed sufficient to maintain marten and fisher viability within the Region. Although the Creeks FEIS did not analyze effects to these abandoned land allocations, the FEIS does disclose effects to marten and marten habitat, and determined that the proposed activities within Creeks may affect marten individuals, but are not likely to result in a trend towards federal listing or loss of species viability (FEIS, Chapter 3, Wildlife section).
32-14	The Creeks project must comply with applicable land and resource management plans, which includes the Quincy Library Group record of decision. (DEIS, p. 9). The QLG plan requires that "habitat connectivity ... be maintained to allow movement of old forest ... species between areas of suitable habitat." (USDA Forest Service 1999c, p. 9). The DEIS concedes, and Dr. Kucera confirms, that the Creeks project	The Creeks analysis discloses effects to habitat connectivity for marten (FEIS, Chapter 3, Wildlife section). The analysis concludes the treatments would reduce canopy cover in some areas to 30%, which, as disclosed, is at the lower end of suitability. However, literature cited in the DEIS and FEIS, Chapter 3, Wildlife section (Thompson and Harestad 1994, and Takats et al. 1999) support the analysis that

Comment #	Comment	Response
	is likely to disrupt habitat connectivity for the marten in the north-south direction. Therefore, the Creeks project is inconsistent with the applicable land and resource management plan, as well as with NFMA and the Forest Service's planning regulations, and cannot be implemented as currently proposed.	stands with >30% canopy would be sufficient to allow travel of marten through the treated areas. Also, RHCA buffers in the south end of the project were established to provide a linkage and connectivity to higher quality habitat to the north. Therefore, while the analysis discloses impacts to habitat quality and affects, the conclusion is that the project would provide for the movement of marten, which is contrary to the opinion of the commenter and Dr. Kucera (FEIS, Chapter 3, Wildlife section). To address connectivity concerns, Alternative 14 was developed) FEIS, Chapter 2) to maintain linkages to large areas of suitable habitat and provide for movement within and through the project area. Please refer to comment 16-1.
32-15	By reducing the amount of marten habitat and increasing the percentage of forest openings, the Creeks Project is likely to adversely affect the marten, particularly when considered together with other past, present, and planned logging within the Quincy Library Group pilot project area. The forest carnivore experts who have reviewed the 2004 Framework have uniformly concluded that the plan threatens the marten's distribution and viability by allowing logging of medium and large trees, reduction in canopy cover, and reduction in large snags and down logs, particularly within the Quincy Library Group pilot project where the Creeks Project is located. (Barrett 2004; Kucera 2004; Buskirk 2003).	The analysis within the Creeks FEIS discloses effects to marten habitat, connectivity and potential reduction in marten populations within the project area (FEIS, Chapter 3, Wildlife section). Although the project would increase the percentage of the landscape in openings, the expected proportion of the landscape in openings post-project (9%) is well within the threshold of 25% as estimated by Takats (1999), a study referenced in the FEIS (FEIS, Chapter 3, Wildlife section). However, while the analysis discloses impacts to habitat quality and affects to connectivity, the determination within the FEIS of the degree of effects to marten distribution and viability differs from the personal opinion of the commenter and Dr. Kucera. The determination within Creeks FEIS for marten, based on the bioregional analysis within the 2004 SNFPA FSEIS, was that the proposed activities within Creeks may affect marten individuals, but are not likely to result in a trend towards federal listing or loss of species viability (FEIS, Chapter 3, Wildlife section). While the commenter states that forest carnivore exports have concluded that actions proposed under the Quincy Library Group pilot project threaten the marten's distribution and viability, the 2004 ROD for the SNFPA considered the actions under the HFQLG program and determined that projects following the guidelines within the SNFPA would not lead to a trend towards federal listing for any sensitive species at the bioregional scale.
32-16	The pilot project would potentially log approximately 64,000 acres of the currently suitable habitat for the marten. (USDA Forest Service 1999a, p. 116). Most of the logged areas will likely be rendered unsuitable for the marten, given the new standards allowing logging of large trees and eliminating protection for canopy closure. As expressed by the Fish and Wildlife Service, "the unrestricted reduction in canopy cover and significant reduction of snags and logs on the eastside would reduce potential forest carnivore denning and resting sites." (USDI Fish and Wildlife Service 1999, p. 12).	The analysis of effects to marten within the FEIS states that the proposed actions within Creeks would reduce high quality habitat within treatment units from 5,842 acres to 3,186 acres, and that within the entire project area, high quality suitable habitat for marten would be reduced 4% post-treatment from 17,693 acres to 15,034 acres. As designed, projects within Creeks would retain large trees >30" dbh, canopy cover would be kept at or above 30%, the minimum for marten travel as analyzed on page 123 of the DEIS and FEIS, Chapter 3, Wildlife section, snag retention would be 4 per acre in mixed-conifer and 6 per acre in red fir, and downed log retention would be 10-12 tons per acre in logs >12" diameter. The commenter's quote from USDI Fish and Wildlife Service 1999, p. 12, regarding

Comment #	Comment	Response
		potential threats to marten on the "eastside" is not applicable to this project, as the Creeks project is not located in eastside habitats.
32-17	The 2004 ROD allows 8,700 acres per year of group selection openings in the QLG area. (USDA Forest Service 2004b, p. 259). Martens are highly vulnerable to forest fragmentation and are generally not found "in landscapes with greater than 25 percent of the area in openings, even where suitable habitat connectivity exists." (USDA Forest Service 200la, Volume 3, Chapter 3, part 4.4, p. 19). As summarized by Dr. Kucera, as a result of the group selection openings, "any martens that may occur in these forests will be negatively affected, and such fragmentation will inhibit or prevent future recolonization." (Kucera 2004, p. 3).	The analysis within the Creeks FEIS discloses effects to marten habitat, connectivity and potential reduction in marten populations within the project area (FEIS, Chapter 3, Wildlife section). As disclosed, although the project would increase the percentage of the landscape in openings, the expected proportion of the landscape in openings post-project (9%) is well within the threshold of 25% as estimated by Takats (1999), a study referenced in Chapter 3 (Wildlife section) of the FEIS. Therefore, based on published literature, the openings created as proposed by the Creeks project should not inhibit or prevent future recolonization, as the commenter suggests. To address the issue of connectivity, Alternative 14 was developed (FEIS, Chapter 2) to improve connectivity for areas treated through the DFPZ prescription. Please refer to comment 16-1.
32-18	The 2004 Framework allows construction of tens of thousands of acres of DFPZs throughout the pilot project area, reducing and degrading suitable habitat and further fragmenting the remaining habitat. DFPZs are expected to result in "relatively open stands" in which "the forest floor would usually be relatively open, with the exception of occasional large logs" (USDA Forest Service 1999b, p. 2-20), which is antithetical to suitable marten resting and foraging habitat. (Barrett 1999, p. 6). In general, the creation of DFPZs would decrease denning and foraging habitat within the pilot project area. With DFPZ maintenance, this decrease in habitat would be perpetuated.	The ROD for the 2004 SNFPA analyzed the affects to marten as a result of DFPZ creation in the HFQLG pilot project, and determined that if actions under HFQLG met the criteria analyzed in the HFQLG FEIS and the SNFPA FSEIS, then those actions would not jeopardize marten viability. Therefore, both the 2004 SNFPA ROD and the analysis within the Creeks FEIS both recognize that habitat quality for marten would be reduced, however, the actions would not lead to a loss of marten viability or trend towards federal listing. The FEIS addresses DFPZ maintenance, resulting in a statement that stands within DFPZs would be considered only marginally suitable for foraging and would not retain attributes necessary for reproductive sites (FEIS, Chapter 3, Wildlife section), which agrees in part with the opinion of the commenter.
32-19	The Pacific fisher is a forest carnivore that is closely associated with older forests with medium and large trees, dense canopy cover, and abundant large snags and down wood. The Creeks project would degrade fisher habitat by logging medium and large trees, reducing canopy cover, removing large snags and down logs, and fragmenting the remaining forest. The USDI Fish and Wildlife Service (USFWS) concluded that the fisher warrants protection under the Endangered Species Act. The USFWS (USDI Fish and Wildlife Service 2004, p. 18788) cited loss and fragmentation of habitat and further decline and isolation of populations as the primary threats to the fisher, and questioned the adequacy of the 2004 Sierra Nevada Forest Plan Amendment to protect fisher habitat. The USFWS specifically mentioned "timber harvest, fuels reduction treatments, and road construction" on federal lands as threats to fisher "distribution, abundance, and recovery/recolonization potential." (Ibid.). Under these circumstances, the fisher's habitat in the Sierra Nevada requires protection and restoration, not further degradation. Unfortunately, as Dr. Kucera concludes, "the	As explained within Chapter 3 of the FEIS, fisher do not appear to overlap with marten, and snow depth may limit fisher distribution. Due to this habitat preference of fisher, and because of the elevation and average snow depth of the project area, the project area was considered to provide very limited habitat for fisher. Thus, because fisher appear to be extirpated from the northern Sierra, and due to the very limited habitat within the project area, fisher were excluded from the Creeks analysis (FEIS, Chapter 3, Wildlife section). Therefore, the commenter's general concerns regarding effects of timber harvest to fisher habitat, and specific concerns that the Creeks project would further degrade fisher habitat, threaten the fisher's viability and continue the trend towards extinction, are not pertinent to this project due to lack of fisher habitat within the project area.

Comment #	Comment	Response
	Creeks project will further degrade fisher habitat, threatening the fisher's viability and contributing to the present trend towards extinction." (Kucera 2005, p. 5).	
32-20	As mentioned briefly in the DEIS (p. 120), the fisher's current distribution in California comprises two populations, one in the southern Sierra Nevada and the other in the Klamath Province, separated by some 260 miles. This isolated population structure is a major reason that the USDI Fish and Wildlife Service decided that the fisher warranted listing as threatened or endangered. The DEIS (p. 120) states "Suitable fisher habitat is similar to that described for marten (Table 3-29)", yet on p. 123 states "Based on habitat preferences the project area provides very limited habitat for this species therefore the project would have little or no affect (sic) on the totality of habitat within its former range. Because neither individuals nor suitable habitat would be affected, the fisher is not further analyzed in this document." If suitable fisher habitat is similar to that of marten, and if there is marten habitat throughout the project area, then there is likely to be suitable fisher habitat. As Kucera concludes, "[t]he decision to eliminate fishers from analysis in the document, based on a contradiction, is unsupportable." (Kucera 2005, p. 6).	The commenter's perception of a contradiction within the DEIS, based on a quote from Dr. Kucera, in statements regarding fisher and marten habitat appears to arise from a misinterpretation of the data related to a statement on page 120 of the DEIS. This misinterpretation led Dr. Kucera to state that the decision to eliminate the fisher from analysis within the DEIS based on a contradiction was unsupportable. On page 120 of the DEIS a statement is made that suitable fisher habitat is similar to that described for marten. What was meant by this statement was that the overall structure of the habitat was similar between the two species. However, as further explained on pages 120 and 121 of the DEIS, fisher do not appear to overlap with marten and snow depth may limit fisher distribution. Due to this habitat preference of fisher, and because of the elevation and average snow depth of the project area, the project area was considered to provide very limited habitat for fisher. Thus, because fisher appear to be extirpated from the northern Sierra (DEIS p. 120), and due to the very limited habitat within the project area (DEIS p. 123), fisher were excluded from the Creeks analysis; the decision to exclude fisher from analysis was not based on a contradiction. This information was carried forward in Chapter 3 of the Creeks Project FEIS.
32-21	There is widespread agreement that the southern Sierra fisher population is not viable in the long term in the absence of efforts to expand the current range and to connect the population with the fisher population in northwestern California. (Barrett 2004, p. 6; Buskirk 2003). [...] Facilitating the fisher's dispersal to, and recolonization of, the central and northern Sierra Nevada requires that habitat be provided to promote connectivity and reduce fragmentation. "Retaining suitable habitat within and outside of the Southern Sierra Fisher Conservation Area is necessary to maintain linkage between the southern Sierra Nevada population and the population in northwest California." (USDI Fish and Wildlife Service 2001, p. 134). "To facilitate recolonization, the Forest Service must provide sufficient habitat for fisher denning, resting, and foraging, and that habitat must be located in a manner that will promote the fisher's occupation of, and movement throughout, the region." (Barrett 2004a, p. 6). "The curtailment of habitat connectivity and genetic interchange between the southern Sierra Nevada fisher population and those in northwestern California ... may also result in the isolation of the southern Sierra Nevada fisher population, subjecting it to stochastic events and possible extirpation." (USDI Fish and Wildlife Service 2001, p. 134). The need to promote fisher habitat in the central and northern Sierra is particularly acute given that old forests are "considerably more vulnerable" in this region and generally "occur in scattered, isolated blocks and small patches." (USDA Forest	As stated on pages 120 and 121 of the DEIS and within Chapter 3 of the FEIS (FEIS, Chapter 3, Wildlife section), fisher do not appear to overlap with marten and snow depth may limit fisher distribution. Due to this habitat preference of fisher, and because of the elevation and average snow depth of the project area, the project area was considered to provide very limited habitat for fisher. Thus, because fisher appear to be extirpated from the northern Sierra (DEIS p. 120), and due to the very limited habitat within the project area (DEIS p. 123), fisher were excluded from the Creeks analysis. The commenter provides evidence from a variety of sources regarding the vulnerability of fisher populations within the Sierras. These may or not be valid observations in a general, large scale sense, but because of the lack of fisher habitat in the project area due to elevation and average snow depth, these observations and concerns are not pertinent for the site-specific area covered by the Creeks analysis area.

Comment #	Comment	Response
	Service 2000, p. 3-7). "The loss of structurally complex forest and the loss and fragmentation of suitable habitat by roads and residential development have likely played significant roles in both the loss of fishers from the central and northern Sierra Nevada and the fisher's failure to recolonize these areas." (USDI Fish and Wildlife Service 2004, p. 18778). The 2004 Framework significantly weakens protection of fisher habitat in the central and northern Sierra. [...] As stated by the Fish and Wildlife Service in its consultation on the QLG pilot project, "the proposed action will disproportionately affect suitable habitat for [the fisher].... The Service is concerned that the proposed project will preclude recovery of this species within the project area and throughout the Sierra Nevada." [...] In sum, by allowing significantly increased logging in the central and northern Sierra Nevada, particularly within the QLG pilot project area, the 2004 Framework will reduce the likelihood of the fisher's dispersal to and recolonization of this area, thereby threatening the viability of the fisher throughout the Sierra Nevada. (Barrett 2004; Kucera 2004). The Creeks project, which implements the QLG plan and 2004 ROD, substantially contributes to this risk. (Kucera 2005).	
32-22	The Creeks project area appears to be particularly important in reestablishing habitat connectivity for the fisher. As described by Britting (2005) and discussed below, the DEIS fails to disclose or analyze the amount and intensity of past, present, and proposed logging on private lands within and near the Creeks project area. However, the Storrie Fire EA suggests that private lands to the east of the project area have been heavily logged, rendering habitat unsuitable for forest carnivores. This information is not disclosed or assessed in the Creeks DEIS, making it impossible to assess the landscape-level impacts on the fisher of implementing the project. Because the project area is surrounded on the east by heavily logged industrial timberlands, it comprises important potential habitat providing north-south connectivity for fisher, as well as marten. Therefore, as Dr. Kucera concludes, "degrading the habitat that currently exists, as proposed in the Creeks project, is likely to increase risks to fisher recovery and reduce the likelihood of establishing a viable population within the project area and throughout the Sierra Nevada." (Kucera 2005, p. 6).	As explained on pages 120 and 121 of the DEIS, fisher do not appear to overlap with marten and snow depth may limit fisher distribution. Due to this habitat preference of fisher, and because of the elevation and average snow depth of the project area, the project area was considered to provide very limited habitat for fisher. Thus, because fisher appear to be extirpated from the northern Sierra (DEIS p. 120), and due to the very limited habitat within the project area (DEIS p. 123), fisher were excluded from the Creeks analysis. Therefore, because the Creeks analysis area was considered unsuitable for fisher, a landscape-level impacts analysis for fisher as recommended by the commenter was not required for the Creeks analysis area, the proposed actions within Creeks should not affect north-south connectivity of fisher habitat, counter to what the commenter suggests, and the proposed actions within Creeks should not increase risks to fisher recovery or reduce the likelihood of establishing a viable population within the project area or throughout the Sierra Nevada, as the commenter suggests in the quote from Dr. Kucera. This information was carried forward in Chapter 3 of the Creeks Project FEIS. The Creeks analysis did disclose affects to north-south habitat connectivity for marten (DEIS p. 126-127, 129-131). The analysis indicates the treatments would reduce canopy cover in some areas to 30%, which, as disclosed, is at the lower end of suitability. However, literature cited in the DEIS (Thompson and Harestad 1994, and Takats et al. 1999) support the analysis that stands with >30% canopy would be sufficient to allow travel of marten through the treated areas. Also, RHCA buffers in key areas were established to provide a key linkage and connectivity to higher quality

Comment #	Comment	Response
		habitat to the north. Therefore, while the analysis disclosed impacts to habitat quality and effects to connectivity, the assessment was that the project would continue to provide for the north-south movement of marten through the Creeks analysis area. To address the issue, Alternative 14 was developed (FEIS, Chapter 2) to provide higher habitat value in areas considered key to maintaining connectivity within the project area. Please refer to comment 16-1 for a description of the alternative.
32-25	The 2004 ROD requires the Forest Service to "determine snag retention levels on an individual project basis" and to "consider the following guidelines for large-snag retention ...." (USDA Forest Service 2004a, p. 69). Based on our review of the Creeks DEIS (pp. 34, 36, 38, 45-46), we were unable to find any numeric snag-retention levels or to find that the Forest Service considered the specific large-snag retention standards identified in the 2004 ROD. With respect to DFPZs, the DEIS (p. 34) states that "snags would be retained following the snag retention guidelines for this project," but a review of those guidelines (DEIS, pp. 45-46) does not reveal any numeric or other snag retention standards. With respect to area thinning, the DEIS (p. 36) states that "snags would be retained at 2-6 per acre following the snag retention guidelines for this project," but those guidelines appear to lack any direction regarding the size of snags that must be retained. The DEIS (p. 45) discloses that "in most areas snags are below the recommended numbers and do not meet the Forest LRMP." Because sensitive species like the California spotted owl, American marten, and pileated woodpecker require an abundance of large snags, it is essential that the project clearly delineate standards for retention and recruitment of large snags. "Snags should be tallied by size, species, and decay class, and prescriptions for snag retention within thinned areas should specify sizes of snags to be retained, with an emphasis on retaining the largest snags available." (Blakesley 2005, p. 4). The proposed action should be modified and clarified to include specific standards for snag retention, giving consideration to the standards recommended in the 2004 ROD.	The snag marking guidelines (FEIS, Appendix D) call for 2 - 4 snags per acre within mixed conifer (including pine and white fir stands) and 4 - 6 snags per acre within red fir stands. Additionally, snag retention is based on a number of factors including species, size, and stage of decay. The snag guidelines that are outlined in the FEIS were designed to retain snags at the landscape level with specific instructions (Appendix D) to facilitate retaining snags at the project level while addressing the need to meet OSHA standards. It should be noted that the range of snags per acre is to account for areas that are snag deficient (where snag densities do not equal 4 or 6 per acre), not to necessarily limit the number of snags within a treated area. If 4 snags per acre can be obtained and meet safety concerns, then that level of retention would be met. The snag retention guidelines utilized during marking have been added to the FEIS Appendix D.
32-27	The National Forest Management Act and its regulations (36 CFR § 219.19 (a) (2) & (6)) require the Forest Service to evaluate the habitat and population trends of management indicator species in the planning area. The Forest Service Manual (FSM 2620) also requires the Forest Service to monitor habitat conditions for MIS and to maintain their viability. The FSM and NEPA (40 CFR § 1508.7) requires that the Forest Service assess the cumulative impacts to MIS species. Here, however, the Creeks DEIS lacks benchmark habitat and population data for the management indicator species. (Preston 2005). Without information on benchmark conditions for MIS in the planning area, the Forest Service cannot make a scientifically supportable finding as to the health or viability of the indicator species. Baseline data is essential to establishing any long-term	The FEIS utilizes population data where it exists but also utilizes habitat as an indicator of impacts (FEIS, Chapter 3, Wildlife section). Please refer to comment 32-10 for a discussion of habitat usage and MIS.

Comment #	Comment	Response
	monitoring program. Without pre-project monitoring and acquisition of data, it is impossible for the Forest Service to link the impacts with the activity (cause and effect). (Preston 2005) As discussed by Preston, this informational gap is particularly critical regarding certain MIS such as mule deer, grey squirrel and the woodpecker group. (Id.)	
32-28	The Forest Service has still not conducted a meaningful review on the impacts of the H-F QLG pilot project on a variety of wildlife including the Lassen NF MIS. The 1999 QLG FEIS section A A-18 identifies changes in habitat values for MIS in the pilot project area. Many of these predicted changes indicate significant adverse cumulative impacts and threat to viability of a number of MIS species. (Preston 2005). For example, the Grey Squirrel is expected to see a 45% reduction in habitat due to group selection logging and a 9% reduction in habitat due to DFPZ construction. Pileated Woodpecker is expected to see a 35% reduction in habitat due to group selection and a 23% reduction due to DFPZ construction. The Creeks DEIS fails to assess the cumulative impacts from the QLG project to forest plan MIS which migrate through, disperse young, and utilize habitat within and outside the project area. The MIS analysis is flawed for not considering the forest plan level cumulative impacts while utilizing forest plan level indicators and for failing to assess impacts from the HFQLG Pilot Project program of work.	A further analysis of the HFQLG FEIS is beyond the scope of this project. The project considered the cumulative effects at the Almanor Ranger District level which was the largest area that allowed for a meaningful comparison.
32-29	The Creeks DEIS fails to meet forest plan requirements for the monitoring of MIS in the 2004 ROD. The 2004 ROD incorporates and adopts the monitoring requirements of the 2001 ROD. (USDA Forest Service 2004a, p. 70). The 2001 ROD identifies MIS and SAR where population tracking and monitoring of population trend is "expected annually." (USDA Forest Service 200la, Vol. 4, Appendix E, Tables E9, E10, El 1). As shown in Preston 2005, the Creeks DEIS fails to mention or address impacts to the expanded MIS/SARs list in the 2001 ROD, which is part of the Forest Service's management responsibility under the 2004 SNFPA ROD. There is also no evidence in the record showing the region, forest or district has met the annual population monitoring requirement. Since the Creeks DEIS lacks necessary monitoring or population trend data, its conclusions regarding impacts to wildlife are unsupported, and the project is not consistent with the 2004 ROD.	Neither the 2001 or 2004 SNFPA ROD modified the LNF MIS list nor is there direction to analyze SAR.
32-34	The need for consideration of alternative management approaches is particularly apt given the Forest Service's acknowledged uncertainty regarding implementation of different strategies. For example, the Forest Service's QLG Administrative Study for the pilot project states that "key uncertainties" remain regarding "the effects of landscape-scale fuels treatments strategies that thin large areas of forest on CSO density, population trends, and habitat suitability at the landscape scale and how thinning effects habitat quality at the core area/home range scale." (USDA Forest Service 2002). The Forest Service's uncertainty regarding the proper course of action makes its review of alternatives that propose different approaches to meeting	Thank you for the comment.

Comment #	Comment	Response
	Forest Service goals all the more important.	
32-37	The information and analysis in the DEIS with respect to the impacts of the Creeks project on the structural attributes of old forests - snags, canopy cover, and medium-large trees - is incomplete, inconsistent, and misleading. Therefore, it is not possible to accurately assess the project's likely impacts on old forest habitat and associated species, such as the California spotted owl, American marten, and pileated woodpecker. NEPA requires that information in an EIS be "accurate" and "of high quality," 40 C.F.R. § 1500.1, and that EISs provide "full and fair discussion of significant environmental impacts," 40 C.F.R. § 1502.1. The failure to include accurate and complete information in the Creeks DEIS with respect to snags, canopy cover, and medium-large trees is therefore contrary to NEPA.	The DEIS and FEIS provides the data that was available. The data on canopy cover and medium/large trees was outlined in the Silvicultural Resources section as well as the Wildlife section. Since the commenter did not provide an example it is difficult to provide a more definitive response.
32-39	The DEIS fails to specify the project's snag retention levels, as required by the 2004 ROD. (USDA Forest Service 2004a, p. 69). Without this information, it is not possible to assess the project's likely adverse impacts on habitat values. Beyond that, the DEIS acknowledges that the number of snags is generally less than the recommended level in the planning area (p. 104), and discloses that "there would be a general reduction in the number of snags within the areas treated" (p. 106), but then confusingly asserts that "it is estimated that ... snag numbers ... would continue to increase within the project area as a whole" (p. 106). The DEIS fails to disclose the basis for predicting that snags will increase.	The Integrated Design Features within the FEIS (Chapter 2) clearly show the snag retention numbers developed for this project. Appendix D (FEIS) also provides the snag marking guidelines that would be used to meet snag needs across the landscape. As explained in the FEIS (FEIS, Chapter 3, Wildlife section), snags are episodic and the loss during project implementation would be a small part of the overall numbers at the landscape level; natural recruitment will increase the number of snags over time.
32-40	The DEIS [...] fails to distinguish between the sizes of snags, despite the fact that species like the pileated woodpecker and American marten preferentially utilize large snags, which are generally less available. Because the DEIS refers to snag decay class only, without reference to the size of snags, the "information presented ... is not very useful." (Blakesley 2005, p. 4). In sum, an adequate analysis would specify large snag retention levels, analyze the number and sizes of snags likely to remain after the project is implemented, disclose the basis for such predictions, and analyze likely impacts on wildlife. The DEIS fails adequately to address any of these issues and therefore fails to meet NEPA's requirements.	Although individual measurements of snag size was not recorded during habitat surveys, the minimum size recorded was 15 inches dbh and 20 feet in height as discussed in the FEIS (FEIS, Chapter 3, Wildlife section). Snag retention guidelines (FEIS, Appendix D) call for retention of the largest snags and preferentially select for those greater than 24 inches dbh. Although we estimate that the total numbers of snags would increase through natural mortality, there is virtually no way to adequately estimate the size and number of snags that would be retained as the snag levels across the landscape are subject to change annually due to winter weather conditions, the amount of precipitation, temperature, and a host of other factors.
32-42	The DEIS fails adequately to assess the Creeks project's likely impacts to the California spotted owl and its habitat. In particular, the DEIS lacks any analysis of the project's impacts to owl home range core areas (HRCAs), but instead assumes incorrectly that protecting 1000 acres within each owl territory is sufficient to avoid impacts to resident owls. The failure to include essential information and analysis in the EIS violates NEPA. [...] Because of the ecological importance of HRCAs, the Pacific Southwest Research Station's Science Consistency Review urged the Forest Service to reveal the number of HRCAs that would be logged and the amount of habitat that would be degraded within individual HRCAs. (Stine and Keane 2003, pp. 4, 6). Unfortunately, neither the 2004 FSEIS nor the Creeks planning documents	Please refer to response to comment 19-3, 19-13- and 19-15.

Comment #	Comment	Response
	include this essential information. As stated in the FSEIS for the 2004 Framework: "The SEIS spatial analysis could only provide an approximation of potential treatments to HRCAs because the exact location of treatments units (and the amount of treatment overlap with HRCAs and the amount of suitable habitat affected) would only be known during site-specific planning." (USDA Forest Service 2004b, Vol. 2, p. 45). The Forest Service has analyzed project impacts to individual owl HRCAs in other QLG projects, such as Meadow Valley and Basin on the Plumas National Forest (Plumas National Forest 2004a, pp. 85-90; Plumas National Forest 2004b, p. 50), and the information is available in the Forest Service's GIS data base. (Britting 2005). There is no justifiable reason for failing to include this essential information in the Creeks EIS. The DEIS (p. 109) analyzes the project's impacts on owl territories based on the assumption that "a minimum of approximately 1,000 acres of suitable habitat is required for a given territory to remain viable." However, not only is this figure too low (as demonstrated above), but this analysis is not functionally the same as assessing impacts to HRCAs, for two reasons. First, HRCAs are located within "the closest proximity to the owl activity center" (USDA Forest Service 2004a, p. 39), whereas the analysis in the DEIS considers all habitat anywhere within the owl territory to be equivalent. Because research indicates that habitat closer to the activity center is ecologically more important, this is a significant difference. Second, HRCAs must include "the best available California spotted owl habitat" (ibid.), which places a priority on owl nesting habitat over owl foraging habitat, whereas the analysis in the DEIS lumps all suitable habitat together. In sum, only by assessing impacts to individual owl HRCAs can the Forest Service determine the likelihood of adversely affecting owl pairs and the resulting impact on the broader owl population. Therefore, this information needs to be included in the revised DEIS.	
32-43	The DEIS is [...] flawed because it appears to contain erroneous and misleading information about the "area of concern" identified by owl scientists. The DEIS (p. 110) states that "the project occurs generally south of an area of concern (AOC 2)." In fact, analysis by Britting (2005), based on GIS data supplied by the Forest Service, indicates that the Creeks project would log approximately 551 acres within AOC 2. Therefore, the project could exacerbate the problems regarding habitat fragmentation that prompted the identification of the area of concern by owl scientists. This important discrepancy needs to be corrected.	See also response to comment numbers 32-2 and 32-3 .
32-44	The Creeks project together with other planned projects in the vicinity will "reduce the suitability on many thousands of acres of nesting and foraging habitat for" the owl within the area between AOC 2 and AOC 3. The extent of this logging raises the possibility that the areas of concern will need to be expanded due to habitat fragmentation and connectivity concerns. (Britting 2005, p. 4). This potential	See response to comment 32-2 and 32-3.

Comment #	Comment	Response
	cumulative impact needs to be addressed in the EIS.	
32-45	The DEIS fails to take a hard look at the project's likely impacts on the American marten. As described by Kucera (2005), the DEIS (p. 126) asserts that the 30% canopy cover to be maintained in Prescription B is sufficient "to allow movement through an area," citing Thompson and Harestad (1994). This assertion is based on weak evidence. On page 123, the DEIS states "Thompson and Harestad (1994) found marten avoided forests with less than 30% canopy cover and preferred a canopy of 50-75%." Thus, according to the Thompson and Harestad (1994) figures, 30% canopy coverage is a bare minimum that may be tolerated, not a goal to be achieved to maintain martens. Further, the Thompson and Harestad paper is a review of literature, not original research, and their canopy-cover figures are assumptions. Original research conducted on the Tahoe National Forest found that ".. .marten throughout the study area preferred stands with 40-60% canopy closure at both resting and foraging sites, and avoided stands with less than 30% closure" (Spencer et al. 1983, p. 1183). Thus, as Kucera concludes, "forests with 30% canopy closure should be regarded as not adequate to provide even moderate marten habitat." (Kucera 2005, p. 3). The description of Prescription B in the DEIS (p. 35), however, contains no standards for minimum canopy retention, so even the marginal habitat provided by 30% canopy cover is not assured.	The network of forest carnivore territories and corridors established in the LNF LRMP are no longer recognized land allocations as per the 2004 SNFPA ROD. In lieu of this network, the 2004 SNFPA ROD established consistent standards and guidelines that were deemed sufficient to maintain marten and fisher viability within the Region. Although the Creeks FEIS did not analyze effects to these abandoned land allocations, the FEIS did disclose effects to marten and marten habitat (FEIS, Chapter 3, Wildlife section), and determined that the proposed activities within Creeks may affect marten individuals, but are not likely to result in a trend towards federal listing or loss of species viability. Potential effects to connectivity and habitat fragmentation for marten were analyzed and disclosed within the FEIS. The FEIS considered stands with 30% canopy as minimally suitable for connectivity based on the studies conducted by Takat and others (Please see response to comment numbers 16-3 and 16-5) but did not use stands with less than 40% canopy within the calculations for suitable habitat. The issue of connectivity was address through the development of Alternative 14 (FEIS, Chapter 2) which would retain key habitat attributes within those areas considered most important for connectivity to habitat. Please refer to response to comment 16-1.
32-46	The DEIS fails to take a hard look at the project's likely adverse impacts to the pileated woodpecker. The Lassen National Forest has designated the pileated woodpecker as a "management indicator species" (MIS) because of its association with large snags and dense canopy forests. (Lassen National Forest 1992b, p. 3-98). According to the Lassen forest plan, the pileated woodpecker's preferred habitat includes an abundance of large snags greater than 20-25" dbh. (Lassen National Forest 1992a, p. O-17). At the outset, the DEIS concedes that "there is no local data concerning local population trends for this species." (DEIS, p. 141). Yet, under the 2004 ROD (which adopts the monitoring requirements of the 2001 ROD), the pileated woodpecker is listed as an MIS species for which "population trend data is expected to be obtained" (USDA Forest Service 200la, Vol. 4, P. E-64), beginning with "a period of annual population monitoring" (ibid., p. E-63). Therefore, as discussed earlier, the failure to obtain monitoring data for the pileated woodpecker and other MIS is contrary to law.	The commenter has misinterpreted the 2001 SNFPA. The monitoring referred to is a bio-regional monitoring strategy that includes a wide range of species. It is part of the adaptive management strategy employed in both the 2001 SNFPA and the 2004 SNFPA FSEIS. To date no specific information on the results of the monitoring have been made available. Please also see response to comment 32 -47.
32-47	The Creeks DEIS (p. 15) estimates that the project would have "no affect" on the pileated woodpecker or its population trend. However, this conclusion is not well supported and is not consistent with other information in the EIS and the best available research. For example, the QLG EIS reports that implementing the QLG project would significantly reduce habitat value for the pileated woodpecker, by 23-35	The DEIS did not state that the project would have no affect on the woodpecker, but rather concluded that the risk to population trends is low. The conclusion was based on the acres of suitable habitat being impacted when compared to the project and the Almanor Ranger District landbase, the snag retention guidelines, and the impact resulting from the predicted changes in habitat based on the most recent research.

Comment #	Comment	Response
	percent. (USDA Forest Service 1999b, p. AA-19). Elsewhere, the Creeks DEIS (p. 218) discloses that "reductions in decadence (snag and down logs) could adversely affect some populations of... woodpeckers." The DEIS's conclusion of "no affect" to pileated woodpeckers was based on the assumption that retaining one snag/acre over 20" dbh is sufficient "to meet suitability standards." (DEIS, p. 142). However, the assumption that providing only one large snag per acre will meet the pileated woodpecker's habitat needs is based on an outdated 1983 report that does not reflect the best available research. The Lassen National Forest's own wildlife habitat capability model for the pileated woodpecker describes areas containing fewer than 3 snags/acre greater than 20" dbh as providing only "low" or "marginal" habitat for the woodpecker. (Lassen National Forest 1992a, p. O-17). Instead, the pileated woodpecker requires habitat with greater than 3 large snags/acres. (Ibid.). The DEIS discloses that "in most areas snags are below the recommended numbers and do not meet the Forest LRMP" (p. 45) and that "there would be a general reduction in the number of snags within the areas treated" (p. 106). Therefore, it appears that large snag levels, which are already deficient, will be further reduced if the Creeks project is implemented. Based on the pileated woodpecker's habitat requirements, such a reduction in large snags is likely to adversely affect the species and its population. Therefore, the conclusion in the DEIS that the Creeks project will have "no affect" on the woodpecker is implausible, and fails to reflect the "hard look" at environmental impacts required by NEPA.	As outlined in the discussion on habitat attributes, there are many ways of defining suitable habitat. The project snag retention guidelines would ensure that snags suitable for pileated woodpecker nesting (>20 acres) would be retained within the project area, meeting Schroeders (1983) description of habitat needs on a per acre basis (Habitat Suitability Index Model, US Fish and Wildlife Service). Bull and others have not defined a snag retention number for management on a per acre basis. Habitat suitability data is elaborated on in the FEIS (FEIS, Chapter 3, Wildlife section). Bull et al. (2005) did find that fuel treatments leaving less down logs and basal area than would result in either Alternative 1 or 14 decreased foraging opportunities but were still used by pileated woodpeckers.
33-3	Areas of Concern (Verner et al. 1992), Home Range Core Areas (USDA Forest Service 2001 and 2004), Old Forest Emphasis Areas (Ibid.) and the Furbearer Network (Lassen National Forest 1993) have each been identified in planning documents as land allocations or regions that are ecologically important to species dependent upon mature and old forests. Figure 1 [Att 5] shows the locations of Area of Concern 2 (AOC 2), Old Forest Emphasis Areas, and the Furbearer Network in relation to the treatment units. Figure 2 [Att 6] shows the locations of the Home Range Core Areas (HRCAs) and Protected Activity Centers (PACs) for California spotted owl. The Creeks DEIS (p. 110) indicates that "the project occurs generally south of an area of concern (AOC 2)." As shown in Table 2 [Att 2] and Figure 1 [Att 5], the data provided by the Forest Service that was used to evaluate impacts to California spotted owl for the forest plan amendments in 2001 and 2004 indicates that about 551 acres of harvest units occur within AOC 2. Thus, the information in the Creeks DEIS appears to be inaccurate.	Please see response to comments 32-2 and 32-3. The furbearer network (habitat management areas) is no longer a land allocation as that Forest direction was superceded by the 2004 SNFPA ROD.
33-5	The DEIS does not mention that treatment units occur within the Old Forest Emphasis Area and Furbearer Network. Figure 1 provides a landscape level context for the ecological importance of these areas. The Furbearer Network running through	The network of forest carnivore territories and corridors established in the LNF LRMP are no longer a recognized land allocation as per the 2004 SNFPA ROD. The 2004 SNFPA ROD also did not recognize Old Forest Emphasis Areas as land

Comment #	Comment	Response
	the Creeks Project provides linkage to habitat areas to the north and south. The Furbearer Network in the vicinity of the Creeks Project also is somewhat fragmented relative to other portions of the network and reflects the poor quality of habitat described in the DEIS (pp. 125-131). The OFEA in and adjacent to the project area also is somewhat fragmented due to the intermix of private land and poorer habitat quality. However, similar to the Furbearer Network, this portion of the OFEA provides linkage between habitat areas in the north and south. (Figure 1). These portions of the Furbearer Network and the OFEA are important to maintaining landscape level connectivity from north to south in a region where habitat quality is presently fragmented and of marginal quality in some areas. The Creeks DEIS fails adequately to consider the context and opportunities for north-south connectivity and the likely impact that the project will have on further disruption in this region.	allocations. In lieu of the forest carnivore network and Old Forest Emphasis Areas, the 2004 SNFPA ROD established consistent standards and guidelines that were deemed sufficient to maintain marten and fisher viability within the region. Although the Creeks DEIS did not analyze effects to these abandoned land allocations, the DEIS did disclose effects to marten and marten habitat and north-to-south connectivity (DEIS, pages 126-131, and FEIS, Chapter 3), and determined that although habitat quality would indeed decline for marten, north-to-south connectivity through the project area would be maintained. See also Response to Comment 16-1 for a discussion of Alternative 14, which addresses the connectivity issue.
33-6	I examined projects proposed by the Forest Service that are situated between CSO Areas of Concern 2 and 3. Projects > 1,000 acres that have environmental assessments or environmental impact statement recently completed or presently being planned are summarized in Table 3 [Att 3, Summary information for eight timber sale Eas and EISs] and displayed in Figure 3 [Att 7, Map of project boundaries overlay with areas of concern for CSO]. A comparison of the CSO PAC data with the boundaries for the projects listed in Table 3 [Att 3] indicate that CSO PACs are within and adjacent to all of the projects. Within the seven project boundaries, a total of 52,499 acres would be treated (Table 3). Of these acres, about 36,246 acres would be turned into DFPZs where canopy cover in forest types suitable for CSO use can be reduced to 30%. Forest stands with canopy cover less than 50% are recognized in the Creeks DEIS (p. 112) as being marginal to unsuitable for CSO foraging and nesting. Thus, the cumulative effect of these projects, which are proposed for implementation at approximately the same time as the Creeks Project, would be to reduce the suitability on many thousands of acres of nesting and foraging habitat for CSO.	Response to comments 32-2 and 32-3 outline the approach taken with regard to areas of concern. The Creeks Project area does not contain areas meeting the description of an AOC as defined by Verner et al (1992). However, Alternative 14 was developed (FEIS, Chapter 2), in part, to address this issue. Please see response to comment 16-1. The loss of habitat within the HFQLG Pilot Project Area was one of the factors considered in the bioregional assessment for the California spotted owl.
33-8	The projects in question are located directly between Areas of Concern identified in the CASPO Report (Verner et al. 1992). Concern for these areas includes known low densities of CSO, fragmented habitat, and impediments to north-south travel for the birds. (Ibid., pp. 45 and 48). The timing and scale of habitat degradation proposed in the projects listed in Table 3 could well lead to an expansion of existing AOCs 2 and 3 that are to the north and south or the creation of a new AOC. This potential cumulative effect is not considered in the DEIS.	Please see response to comments 32-2 and 32-3. Verner et al. (1992) provided definitions for what he termed areas of concern and very broad maps that were not applicable for project level use. The maps developed during the 2001 SNFPA planning effort were broad as well and were not field verified nor were they part of the management direction. Cumulative project level effects analyses are made at the Forest level and would not include a larger, regional picture.
Watershed/Fisheries/Soils		
1-10	Bringing in logging equipment compacts soil, making it less likely to naturally grow new plants, a negative environmental effect.	As described in the integrated design features (Chapter 2) and through the implementation of BMP's, LRMP standards and guidelines, and provisions in the timber sale contract, adverse impacts to soils would be minimized. In addition, if

Comment #	Comment	Response
		monitoring indicates that compaction beyond acceptable limits is occurring, procedures to protect soil resources would be implemented. These processes are currently in place to ensure that adverse impacts are avoided.
1-6	Cutting trees mean they no longer act as a carbon sink, which is disastrous for our air. cutting trees means erosion. cutting trees means changing climate. All of these actions are disastrous.	Through the implementation of integrated design features, best management practices (BMP's) and adherence to LRMP standards and guidelines, the cutting of trees is expected to result in minimal increases in erosion (Chapter 3, Watershed, Fisheries, Soils). Although the impacts relative to effects on global climate and air is outside the scope of this analysis, the silvicultural prescriptions comprised largely of thinning would ensure that the area would continue to be adequately stocked and tree vigor would be maintained and enhanced.
6-1	The proposed logging project and would be a disaster. Clearcuts, heavy thinning, and road building would cause severe erosion and degradation of these beautiful, clear streams. Habitat for fish spawning and aquatic plants and animals (including the endangered red-legged frog) would be irreparably damaged. The area has already been severely impacted by logging on adjacent land and by the Storrie Fire. You should be considering the cumulative effects of the larger area.	Effects of the project on erosion and fish habitat are considered in the FEIS (Chapter 3, Watershed, Fisheries, Soils). Potential for cumulative effects to aquatic resources are also considered (FEIS, Chapter 3, Watershed, Fisheries, Soils). The Storrie Fire and post fire salvage on both private and public lands were considered in the cumulative effects evaluation. The comment specifically mentions California red legged frog. A site assessment prepared for the project concluded that the project area did not contain suitable habitat for the species (FEIS, Chapter 3, Watershed, Fisheries, Soils).
17-44	Although there is no documented evidence that the USFS is committed to decommissioning more roads that it builds while implementing QLG projects, such a policy has been discussed for good reason. Road maintenance backlogs impacts water quality and soil productivity. Roads that have been decommissioned in the past are shown on project maps as existing or temporary.	The ratio of road decommissioning to road construction for the entire pilot project area is beyond the scope of this project. Road maintenance backlogs are beyond the scope of this project. Roads used within the project area would be maintained to the necessary standards during project implementation. Refer to comment 29-17 regarding the status of open and closed roads within the project area.
25-2	Water Quality Impacts The DEIS indicates that the overall result of project activities would most likely be a reduction in annual delivery of sediment to stream channels due to treatments of road crossings and surfaces (p. 177, emphasis added). The DEIS also indicates that the removal of channel crossings on several roads that are being decommissioned will result in a short-term increase of sediment in stream reaches below these crossings. The document does not provide a description of monitoring that will be performed to assess the long-term impacts to water quality from the project and the potential need for adaptive management based on monitoring results. The DEIS states that appropriate Best Management Practices (BMPs) that protect water quality and soils would be implemented for the project. The document indicates that BMPs are described in Water Quality Management for Forest Service System Lands in California, Best Management Practices (USDA FS, 2000), and describes several specific measures that would be implemented to protect soil and water resources. The referenced Best Management Practices document describes watershed	Monitoring of BMP implementation and effectiveness for HFQLG projects is conducted across the three Forest HFQLG pilot project area. Sample pools (for monitoring of BMP implementation) are created from all harvest units in HFQLG projects. All system roads within these project areas are also included in a pool, as are all broadcast burns within the project area. From these pools, 30 sites are selected for evaluation each year, for assessments of roads, road crossings, timber skid trails, timber landings, and protection of streamside zones during timber harvest. All road decommissioning within the project area are also evaluated. All sites must over-winter at least one year following activity before the site is evaluated. By this means it is very likely that several sites within the Creeks project area would be randomly selected for evaluation. Data from this effort is summarized annually, and results and recommendations are passed along to appropriate managers. Additionally, a monitoring reach has been established in Rock Creek within the project area. Pre-project information was collected during the summer of 2005. Attributes of channel morphology and substrate composition were monitored. Activities upstream of this stream reach include DFPZs, group selection, area

Comment #	Comment	Response
	management practices that include water quality monitoring (Practice 7-6, p. 94) and describes a BMP evaluation process (Section 15, p. 123) for evaluating the implementation and effectiveness of BMPs. However, the DEIS does not indicate how these evaluation tools will be applied to this project, and does not provide a description of the specific monitoring that will take place or the adaptive management practices that will be used. Recommendation: The FEIS should include a specific strategy for monitoring and adaptive management to assure impacts to water quality and other resources are evaluated and practices are modified as necessary to protect these resources. The FEIS should clarify the specific BMPs in the referenced Best Management Practices document that will be used. Specific information should be provided on the type of evaluation and monitoring planned, the responsible party, and the frequency and duration of monitoring activities. The FEIS should estimate the improvements to water quality that will result through the application of BMPs and adaptive management practices.	thinning and road decommissioning. The reach would be re-surveyed following project implementation. A project level review of the project would be conducted after project implementation. This review would include consideration of implementation and effectiveness of water quality protection measures. Representatives of regulatory agencies would be invited to participate in this review. Applicable BMPs to the Creeks Project have been added to the Appendix section of the Creeks Project FEIS (Appendix C). Effects of the project on water quality are assessed in the FEIS (Chapter 3, Watershed, Fisheries, Soils). The analysis concludes there would be no changes in water temperature, and that sediment production would be decreased in the long term. In the short term, no increase in sediment production is expected.
29-17	Lassen Forest Preservation Group is [...] extremely concerned about the plan for building 3.7 miles of new temporary roads and reopening 5 miles of existing unclassified roads. You also plan to build 1.9 miles of new permanent system roads. This will be a net increase of 0.7 miles of roads in the project area. There will be hundreds of trees cut down, even over 30" dbh to build these roads. All these roads will add to habitat loss, fragmentation and increased sedimentation and erosion in our waterways. We have just returned from our most recent trip to the Creeks project and we are alarmed by the lack of correct information available to the public on roads in the area. Following are pictures and discussion of roads that show OPEN on the maps, but are already decommissioned, over grown or closed. *(photographs included with comment)* These roads are slated for use in the Creeks project. Are they included in your miles of "existing temporary roads, new temporary roads, or existing unclassified roads"?	The project would result in an overall decrease of 4.3 miles of existing road within the project area. The new temporary roads and the existing unclassified roads utilized during project implementation would be decommissioned according to the integrated design features in the FEIS (Chapter 2). It is anticipated that in the long term there would be a net reduction in sedimentation from roads. During the roads analysis process (RAP) information was gathered from numerous sources including personal knowledge, surveys, GIS, and field reconnaissance. Not all the roads were visited and conditions may have changed over time. The RAP will be updated to reflect changed conditions. The effects of roads to habitat are considered in the wildlife section and the biological evaluation.
29-19	There is a temporary road UC 21 02 in T27NR5E, section 21, off of road 27N43 planned for use in Creeks. Again, this road is barely "existing". It is right next to a tributary of Butt Creek. Where 27N43 crosses the tributary, the creek is down cut and eroded. The meadow surrounding the crossing and below the crossing is in very poor shape from grazing. This area needs to be "recovered and brought back to health" as this project claims to do for this forest.	As described in the alternatives section of the FEIS (Chapter 2), temporary roads would be used and then decommissioned following project activities.
29-21	Are the 3 roads mentioned [...] [in sections 7,8, and 17 of T26N R6E counted in your miles of estimated roaded acres (ERA)? Are they included in your miles within riparian habitat conservation areas (RHCAs)? Are they counted as "pre project miles or post project miles", as decommissioned or open? Have you counted all the crossings on these roads? How do we know if your statistics about Threshold of	Although we are unsure about exactly which roads you are referring to, if they are existing roads then they have been included in the estimate of ERA's. If any of those roads are within an RHCA, then that road or portion of road is included in the estimates of disturbance within RHCAs. The roads that are existing are counted as pre-project miles. The roads that are existing that would be decommissioned would

Comment #	Comment	Response
	Concern (TOC) are correct if your mapping of miles of roads is in question? There are 299 miles of roads in the Creeks project area and you are planning to permanently close only 1.9 miles.	be classified as such. There are 229 miles of road within the project area, of which 4.3 miles of existing roads would be decommissioned. The FEIS (Chapter 3, Watershed, Fisheries, Soils) contains language clarifying this.
29-22	When you open "decommissioned roads" that were slated for decommissioning or closure in other forest projects we are understandably skeptical of the process. When you use "temporary roads" over and over, although they are "temporary", we are understandably distrustful of the process. It seems a road is a road is a road as long as there are trees to be logged in the forest.	While there are numerous ways to decommission roads, the key to success is denying vehicle access. If this is successfully accomplished the goal of reduced disturbance to wildlife and hydrologic recovery is usually realized. While there may be some limited instances where a previously decommissioned road was utilized for a subsequent project, this is not common and avoided unless absolutely necessary. The description of road decommissioning for this project is contained within the FEIS, integrated design features of the proposed action (Chapter 2). All roads would be contoured to match the existing topography and organic material placed to block traffic and provide for ground cover. Recent decommissionings on the Almanor RD have shown this technique to be highly successful in preventing traffic re-establishment. The treatment also makes it difficult and expensive to re-open roads.
29-23	Photo of closed road in T27N R5E section 21 slated to be used in project on very steep slope.	Thank you for your comment. The Responsible Official will take into consideration all the potential effects from the alternatives at the time of the decision.
29-24	[A] discussion of roads obviously leads to your watershed analysis and our grave concerns for the Grizzly, Butt, Yellow and ultimately Feather River Watershed. The Feather River watershed was once one of the greatest in our state with a huge salmon run and spectacular scenery. Now this watershed is listed as one of the most imperiled in the US due to dams and watershed destruction. The State and Regional Water Quality Control Boards (CWQCB) have entered into agreements with the U.S.F.S. to control non point source discharges by implementing control actions certified by the CWQCB and the EPA as best management practices (BMPs). As the 2004 Framework is in litigation by the attorney general of California and others I would doubt the CWQCB will allow this project to go forward without drastic changes.	An analysis of watershed conditions and cumulative watershed effects relative to the alternatives was conducted for this project. Additional analysis has been conducted and the effects are disclosed in the FEIS (Chapter 3, Watershed, Fisheries, Soils). The project would implement BMP's and other measures necessary to protect and improve water quality and comply with the Management Agency Agreement between the CWQCB and the EPA that you refer to.
29-25	On page 150 you list the beneficial uses of water in the project area and say, "no municipal watersheds will be affected by this project". Unfortunately, this shows the complete disregard by the forest service for the people of California to protect the most important resource generated by our National Forests, WATER. In fact, most California municipalities and citizens South of Oroville will be affected by this project. The Feather River water generates electricity for millions, sends thousands of acre feet south for agriculture and provides recreation WAY beyond the project area. And this says nothing of the benefit of clean, non-polluted drinking water for millions. The consideration for the importance of this precious resource CANNOT be "beyond the scope of this project. You also state on page 166 "The analysis focuses on effects at the sub-watershed scale...A primary assumption of this analysis is that protection of beneficial uses at this scale also results in protection of uses at larger scales." Again, this shows a disregard for the enormity of the water resource you are mandated to	The effects of watershed disturbance are easier to detect and describe at a smaller scale. At larger scales the effects become more diluted and the analysis becomes highly subjective given all the variance and upstream influences. The analysis of sub-watersheds for this project is at a scale that allows for an accurate assessment of current condition and expected effects. The analysis as discussed in the FEIS (Chapter 3, Watershed, Fisheries, Soils) showed that water quality would be adequately protected to preclude adverse effects both individually and cumulatively.

Comment #	Comment	Response
	protect. The analysis should focus on the entire watershed.	
29-27	Ongoing continued erosion from "ditch road" 27N04E R6E, section 20 & 21. Part of this road has been decommissioned but in many areas still continues to erode into Butt Creek. It is shown as open on the Creeks project map. We have been assured by staff that the decommissioned part will not be reopened. It is shown as entirely decommissioned (total length) on the Creeks roads analysis map. *(comment includes phootgraph)*	As noted previously this road was noted as a potential candidate for decommissioning for the reasons noted. There are right-of-way issues associated with this road that preclude full decommissioning and removal from the forest transportation system at this time. Please refer to comment 29-26.
29-28	The headwaters of Grizzly Creek, the watershed most at risk from this project is incredibly impacted by roads and plans for more! You are planning a new road into this area, when this section 5, T26NR5E is literally laced with roads near Little Grizzly campground. Every tributary to Grizzly Creek where there isn't a SOHA or GPAC will be maximally logged with thinnings and clear cuts.	According to information contained in the project GIS files, 0.17 miles of roads within Grizzly Creek would be constructed and added to the transportation system. 2.3 miles of existing roads would be decommissioned, including 0.41 miles of classified roads. This would result in a net decrease in road miles. In addition, 49 road stream crossings within Grizzly Creek would be surfaced with project implementation. Although Grizzly Creek has relatively high road densities, as discussed in the FEIS (Chapter 3, Watershed, Fisheries, Soils), a long term reduction in sediment is expected as a result of these actions
29-30	Photo of road through a meadow and tributary of Butt Creek T27N R6E, Section 20 to access previously thinned area and GS. Creek flows over the down road.	The comment is in error. The area accessed by this road was previously treated with Intermediate Sanitation not a thinning. Erosion problems with the current road location would be addressed and fixed with routine maintenance during project implementation.
29-31	The roads analysis for the Creeks project (RAP), July 2004, lists dozens of opportunities to close, relocate or decommission roads for wildlife, watershed and aquatic concerns. There are dozens of roads running through creeks, through PACs and SOHAs, and into sensitive areas that could be easily closed. The DEIS on page 176 states, "The proposed action treatments would not exceed the ERA threshold for the Grizzly Creek subwatershed, but the high ERA value is a concern and a signal that more watershed restoration activities may be needed in the future. Additional road improvements and decommissioning would reduce the risk associated with the high ERA value. The future is now, the opportunity exists NOW. We are very disappointed that you have not included more restoration activities in this devastating project.	The Responsible Official will take into consideration all the potential effects from the alternatives at the time of the decision. Alternative 8 of the FEIS considered the decommissioning of more roads with this project. As noted in response to comment 29-20, there are many other road activities possible within the project area. The information needed to propose decommissioning of other roads was not available at the time the proposed action was designed. More road decommissioning may be proposed in the future under separate analysis.
29-32	The Grizzly Creek (GC) trail starts at Little Grizzly Creek Campground. This trail is already ruined by ATV traffic. ATVs have ridden down the entire trail, through the creeks and up hills. The erosion will be devastating to the Grizzly Creek watershed. You plan to punch in 2 more "new temporary roads" and many GS in the trail area. Plus more new roads in the area across the GC meadow. This will only invite further encroachment by off-road vehicles into this sensitive area. How will you rectify this? How will this protect the beneficial uses of water in the project area and downstream? This watershed is already dangerously close to TOC. If every road – temporary, closed, unclassified, permanent, ATV or otherwise was truly tallied on this watercourse, including the damage from the Storrie fire, subsequent clear-cut	As described in the FEIS (Chapter 2), roads identified for decommissioning would be re-contoured and blocked with debris to preclude traffic re-establishment. We agree that in certain areas forest thinning has resulted in increased off route OHV traffic. Where this is encountered and resource damage is occurring citations can be issued. The Forest Service is currently working on a route designation process that will hopefully curtail this type of activity. According to GIS estimates, there would be a 2.13 mile net decrease of road miles within Grizzly Creek. Along with adding rock as surface to roads and road channel crossings, this is expected to reduce sediment production in the long term.

Comment #	Comment	Response
	logging, AND grazing, I cannot believe it is not OVER TOC.	
29-33	Have the clear-cuts, thinnings, and DFPZs been added to the ERA figures? Clear cuts have the highest rating, excepting roads, of watershed disturbance. How many acres of clear cuts are planned in the GC watershed alone? How many in the Yellow Creek and Lemm (Wallack) Hollow watersheds? You plan an increase of 4% ERA in the GC watershed, 4% in Lemm Hollow, 3% in Shanghai Creek and 3% in Upper Yellow Creek, pg. 167 DEIS. The Cumulative Watershed Analysis Effects Report (CWE) for the Storrie Post-Fire Restoration Project, April 27, 2001 page 16 states, "When disturbance within third order watershed results in three to four percent increases in ERA, small increases in peak flow can occur. In watersheds where streams are stable and ERA values are not approaching TOC, such increases generally do not stress the system. However, where ERA increases 5-7% point or higher, larger increases in peak flow can occur. When stream channels are in poor condition and the ERA is approaching TOC, a closer look at proposed activities within the watershed is important". We demand a closer look at the proposed activities within these watersheds. The HFQLG EIS recommends a maximum 3% increase in ERA.	The cumulative watershed effects (CWE) analysis prepared for the project (FEIS, Chapter 3, Watershed, Fisheries, Soils) included all planned activities and coefficients were assigned to assess various disturbance impacts. The acres of various treatment activities within the sub-watersheds are within the CWE analysis and are contained within the project files. As described in the FEIS (Chapter 3, Watershed, Fisheries, Soils), surveys and inventories of the affected watersheds indicate that the majority of stream channels were found to be in a stable condition. It is not expected that these increases in ERA values would result in either increased peak flows or channel instability.
29-34	It is also disturbing that none of the watersheds in the Creeks project area meet even moderate road density standards for MIS. And yet you propose 1.9 miles of decommission only.	The actual miles of existing road within the project area proposed for decommissioning is 4.3 miles. Language in the FEIS has been added to clarify this. Road density with regards to MIS are discussed in the FEIS, Chapter 3 (Wildlife section).
29-35	It is important to note also that for the post-fire Storrie project CWE a TOC of 15 was used for analysis, (pg. 16). Yet for this " Creeks Forest Health Recovery Project", which is larger and more destructive, you are using a TOC of 16 for 10 of 13 watersheds. Why is that?	Thresholds of concern (TOC) established as part of the CWE analysis generally range between 12 and 18 percent on the Almanor Ranger District. This value is established using watershed sensitivity indicators, watershed condition surveys, and an evaluation of beneficial uses. Only 3 of the 10 subwatersheds evaluated for this project were evaluated in the Storrie project. These are Grizzly, Lemm Hollow and Soda Creeks. The TOC remained unchanged at 15 percent for these sub-watersheds.
29-36	It is [...] disconcerting and perplexing for public input when you use only "subwatersheds" for analysis. Lemm Hollow creeks and Grizzly Creek both flow into Yellow Creek. Both Grizzly and Middle Yellow are approaching TOC. We would like to see an analysis of the entire Yellow Creek watershed, as this is a trophy trout stream and main tributary to the Feather River.	The analysis, including the identification of appropriate scale was conducted in accordance with Forest Service Handbook direction (R-5 FSH 2509.22) for cumulative off-site watershed effects analysis. Both Grizzly and Lemm Hollow Creeks were analyzed using this methodology. Middle Yellow Creek however, is outside the project area and was not analyzed. The analysis was conducted at the appropriate scale to assess potential adverse impacts to receiving waters, in this case, Yellow Creek.
29-37	The plan for the riparian habitat conservation areas (RHCAs) is inadequate. The 2004 FSEIS recognizes that the 2004-ROD, "may pose higher short term risks to aquatic resources because it prescribes larger amounts of mechanical treatments and greater treatment intensities." (FSEIS, p. 215). I think this is an understatement. Simply look at the map of the project, new roads, clearcuts, area thins and DFPZs	Potential effects of project on stream temperature, sediment and aquatic connectivity are discussed in Chapter 3 (FEIS, Watershed, Fisheries, Soils) as are potential effects on wetlands. Impacts to soils are also discussed in Chapter 3. The analysis concludes that long term detrimental effects would not occur.

Comment #	Comment	Response
	will certainly violate NFMA at 16 U.S.C. 1604(g)(3)(E) which requires the FS to: "...insure that timber will be harvested from NF systems lands only where (i)soil and other watershed conditions will not be irreversibly damaged;...(iii)protection is provided for streams, stream banks, shorelines, lakes, wetlands, and other bodies of water from detrimental changes in water temperatures, blockages of water courses, and deposits of sediment, where harvests are likely to seriously and adversely affect water conditions or fish habitat..." We believe this project will violate NFMA 36 CFR 219 and its implementing regulations by failing to support the finding that the project meets minimum management requirements regarding water quality and soil conservation.	
32-23	The Creeks Project Proposes to Harvest at an Intensity Within RHCAs That Is Inconsistent With the Forest Plan. Harvest activities in the Riparian Habitat Conservation Areas (RHCAs) are regulated by the direction in the 2004 ROD. (USDA Forest Service 2004a). The 2004 ROD directs the HFQLG forests to follow the SAT guidelines as presented in Appendix L of the HFQLG FEIS. (Ibid., p. 67). These guidelines provide for the removal of timber from RHCAs only when necessary to "acquire desired vegetation characteristics needed to attain Riparian Management Objectives." (USDA Forest Service 1999b, p. APP L-12). Further, the SAT guidelines explicitly "prohibit scheduled timber harvest" in RHCAs and "prohibit activities in Riparian Habitat Conservation Areas that are not designed specifically to improve the structure and function of the Riparian Habitat Conservation Areas and benefit fish habitat." (USDA Forest Service 1999b, p. APP L-11). These directives mean that the RHCAs are to be harvested only if that activity maintains or restores the natural structure and function of the area. The proposed action violates the direction in the SAT guidelines in two ways. First, this alternative establishes a purpose that is not consistent with the SAT guidelines. One of the stated purposes of the DFPZ treatments that will be applied to the RHCAs in the Creeks Project is "providing fire suppression personnel safe locations for taking actions in the event of a wildfire." The SAT guidelines do not allow for the modification of RHCAs to meet non-riparian habitat needs. And in fact, reducing canopy cover to 30% in RHCAs5 will likely degrade the existing microclimate and habitat. (Ibid., p. L-9). Second, the Creeks project proposes logging at an intensity beyond what is necessary to meet the Riparian Management Objectives. Recent research and numerous project analyses completed by the Forest Service have demonstrated that achieving substantial increases in fire resiliency do not require a reduction in canopy cover below 50% and the removal of trees between 20" and 30" dbh. (SNFPC et al. 2004, pp. 63-71; Lassen National Forest 2004; Plumas National Forest 2005a).	SAT standard and guide TM-3 provides for unscheduled harvest in RHCA. Project activities within RHCAs would meet RMOs (please see FEIS, Chapter 3, Watershed, Fisheries, Soils). This discussion considers effects of proposed actions on microclimate within RHCAs. Note in particular (Proposed Action, Chapter 2) that canopy cover would not be reduced to 30% within RHCA inner zones. Within outer zones, 30% would be the minimum within treated areas, but the average would be higher. There are many prescriptions that could result in improved fire resiliency, including those included in the action alternatives.

Comment #	Comment	Response
	Furthermore, modeling results with respect to reducing stand densities and increasing the size of the residual trees for other projects near the Creeks Project area indicate that appropriate stand densities can be achieved with less intensive thinning. (Plumas National Forest 2005b, p. 27). Thus, the objectives supported by the SAT guidelines to increase fire resiliency and improve forest health are likely to be achieved by limiting reduction of canopy cover to 50% and to retaining trees over 20" dbh.	
32-24	The Creeks Project Violates the SAT Guidelines by Failing to Propose Measures That Will Restore Large Woody Debris. The intent of the SAT Guidelines is to "maintain or restore good habitat over broad landscapes." (USDA Forest Service 1999b, p. APP L-3). An expected part of project development is to propose mitigation measures to improve habitat conditions. The DEIS identifies that most stream reaches have only a "fair" amount of large woody debris with some having portions of the stream channel rated as "good" for large woody debris. (DEIS, pp. 160-161). Live trees between 20" and 30" dbh are being removed within and near to RHCAs when they could be left standing to serve as future recruitment of large wood or felled to provide large woody debris today. The result of such a measure could be to increase the rating for large woody debris from "fair" to "good" thereby restoring habitat condition as directed by the SAT guidelines. Thus, the proposed activities, such as the removal of larger trees from riparian areas that presently have insufficient large wood, violates the SAT Guidelines and the Riparian Management Objective that directs the restoration and maintenance of channel integrity. This, in turn, violates the forest plan.	Clarification: ratings in DEIS pp 160-161, are (as indicated in DEIS) for large woody recruitment, not large wood in channels. The FEIS contains discussion (Chapter 3, Watershed, Fisheries, Soils) of treatment effects on recruitment of large wood to channels. The analysis concluded that there should be an increase in recruitment of large wood volume in the long term.
32-36	The discussion of private land logging within the analysis area is particularly deficient. The DEIS (p. 241) acknowledges that approximately 5300 acres of private lands affected by the Storrie Fire were logged in 2000 and 2001. However, the DEIS lacks any information regarding the nature and intensity of such logging or its environmental impacts, such as the amount of habitat for sensitive species that was degraded or lost. The Storrie Fire EA states that "the private lands ... that were harvested will remain unsuitable (for forest carnivores) for several decades due to the removal of the majority of material" (Lassen National Forest 2002, p. 118), and that snag retention on these private lands was "far" less than 4 snags per acre (id., p. 100). The cumulative impacts of this past logging, together with other logging of private lands in the analysis area, needs to be analyzed and disclosed in the Creeks DEIS. (Kucera 2005, p. 5). With respect to ongoing and proposed activities on private lands, the DEIS (p. 242) acknowledges that there are "several large parcels of private land within the project boundary" but lacks any description or analysis of logging activities on these lands. The DEIS estimates that 10 percent of these lands will be logged per decade, "using an intermediate cut," but fails to provide the basis for this estimate, to describe what	The estimate the commenter referred to was used in the cumulative watershed effects (CWE) analysis to assess past, present, and reasonably foreseeable harvest activities on private lands within the project area sub-watersheds. It is reflective of the thinning that has typically occurred in the area and based on air photo analysis and discussions with private foresters. Estimates were used where there was a lack of data pertaining to primarily past harvest activities. Additional information pertaining to past and on-going actions has been included in Appendix A of the FEIS. Private, when intermixed with federal lands does leave perplexing management issues when dealing with wide ranging species such as the spotted owl and forest carnivores. The concern is primarily with forests such as the Eldorado and Tahoe where checkerboard ownership is prevalent over wide areas of the land base. With regard to the Storrie Fire, according to Blakesley, locally the owls are not migratory therefore the effects can be considered at the home range level which was done for this project. In their comments to the Storrie Fire analysis, the Sierra Nevada Forest Protection Campaign disagree that the fire was a stand replacing

Comment #	Comment	Response
	an "intermediate cut" entails, or to analyze the likely cumulative impacts of such logging on wildlife habitat, watershed values, and other environmental values. As demonstrated in our appeal of the 2004 ROD (SNFPC et al. 2004, pp. 95-98), it is especially important that the cumulative impacts of private land logging be considered. The California Spotted Owl Federal Advisory Committee, in reviewing the RDEIS, found that consideration of intermingled ownerships was inadequate. [...] The cumulative impacts of private land logging were essentially ignored in the Creeks DEIS, contrary to NEPA.	event with areas of high intensity burns and contended that the habitat was left relatively intact.
Botany		
1-7	Noxious weeds are spread by prescribed burning. all prescribed burning should be banned.	We recognize that some weed infestations may be spread by prescribed fire, and Integrated Design Features for alternatives (FEIS, Chapter 2) were developed to address the potential for weed spread by project activities. By implementing the Integrated Design Feature of treatment and post project monitoring, many known and any new occurrences would be treated annually to ensure that known weed sites do not expand by prescribed burning activities. New locations of noxious weeds that are discovered during project activities or during post-project monitoring are incorporated into the Forest noxious weed program, where monitoring and treatment will continue.
11-11	In the third paragraph on page 47, reference is made that noxious weeds would be "hand pulled or dug" before the project is implemented. Who is pulling these weeds and why aren't Forest Service botanist's pulling these weeds when they drive through the forest?	Lassen National Forest Botany and weed crews inventory and treat all treatable weed occurrences when they are located and prior to project implantation.
17-42	The Noxious Weed Assessment successfully identified Canada Thistle, Bull Thistle and yellow star thistle, but failed to identify Mullein (Verbascum Thapsus) which exists in a log landing in Section 1 T26N R6E. Common mullein threatens natural meadows and forest openings, where it adapts easily to a wide variety of site conditions. Once established, it grows more vigorously than many native herbs and shrubs, and its growth can overtake a site in fairly short order. Common mullein is a prolific seeder and its seeds last a very long time in the soil. An established population of common mullein can be extremely difficult to eradicate. It is estimated that a single plant can produce 100,000-180,000 seeds which may remain viable for more than 100 years. Mullein and Thistles are on site already and other exotic plants are likely to find their way into the Creeks project area through project and non-project vectors. The lineal pattern of forest thinning and the associated ground disturbing activities increases the likelihood of invasive plant metastasis. (photographs included with comment)	The HFQLG Forest Recovery Act, FEIS, Chapter 3, 1999, states that the Secretary of the California Department of Food and Agriculture makes the determination of "noxious". The Noxious Weed Risk Assessment for the Creeks Project (FEIS, Appendix B) addresses those weeds within the project area that are listed by the California Department of Food and Agriculture (CDFA) Noxious Weed species website http://www.cdfa.ca.gov/phpps/ipc/weedinfo/winfo_list-pestrating.htm. Each CDFA A, B, and C rated weed known to the project area is evaluated within the Noxious Weed Risk Assessment. Woolly Mullin (Verbascum thapsus) while present within the project area is not a CDFA rated weed and therefore was not analyzed for this project. The potential for noxious weeds to find their way into the Creeks project area through project and non-project vectors has been addressed within the Noxious Weed Risk Assessment for the Creeks Project (FEIS, Appendix B). The Creeks Project was surveyed for noxious weeds and known sites were documented and treated where possible. Integrated Design Features for the alternatives (FEIS, Chapter 2), including post project monitoring and site-specific treatments were designed to reduce the potential for introduction and spread of existing weed infestations throughout the

Comment #	Comment	Response
		project area.
17-43	Appendix B of the DEIS gives contradictory analysis of the risk. On one hand the DEIS mentions on page 254, "the Creeks Project is relatively free of the many weed species and problems faced in other areas of the forest, giving it a low risk for habitat vulnerability." But on page 255 the DEIS says, "Livestock and wildlife are also present in the analysis area and can serve as potential non-project vectors, posing an additional risk for spreading of noxious week infestations. Thus, the potential risk of noxious weed invasion from non-project dependant vectors appears to be low to moderate." To complete the full spectrum of risk assessment the DEIS states further down on page 255, "Overall, the potential risk of noxious weed invasion from project level habitat alternation [sic] appears to be high, due to the extensive amount of ground that would be disturbed during project implementation." Finally, using what appears to be an inappropriate mathematical average the DEIS summarizes, "potential risk posed by increased vectors appears to be moderate..." The long-term direction implied by the proposed project indicates that exotic weeds will significantly reduce the value of project area land and that timber production, grazing, wildlife habitat and recreational opportunities will all be negatively impacted by an expanding list and presence of invasive exotic plants that thrive under open canopies and on disturbed soil.	Appendix G within the HFQLF Forest Heath Recovery Act, FEIS, Appendix G, 1999, states that to determine the Anticipated Weed Response to the Proposed Action we are to "Tally "high risk" responses in previous factors: consider mitigation if it is adopted as part of the proposed action". Table B-3 within the Noxious Weed Risk Assessment for the Creeks Forest Health Recovery Project FEIS shows that there are low priority weeds found within the project area, low current habitat vulnerability and low to moderate non-project dependant vectors. Moderate to high risks include a high risk of habitat alteration expected as a result of the project and a moderate risk of increased vectors as result of the proposed project. Therefore, with only one "high risk" factor found for the proposed project, and taking into consideration Integrated Design Features (FEIS, Chapter 2), which include treatment and post-project monitoring, a determination was made that the Creeks Forest Health Recovery Project has a moderate potential for weed spread by the implementation of the alternatives.
30-17	Also meriting serious concern is the spread of exotic plants. Fuelbreaks share a number of characteristics with roads, which have been extensively linked with non-native plant invasion (Mooney & Hobbs 2000, Forman et al. 2000). In fact, fuelbreaks have themselves been likened to "invasive highways" (Keeley 2001). The proposed fuelbreaks would promote invasion by removing dominant competitors, opening forest canopies, disturbing soils, and changing hydrologic conditions (reviewed in Mooney and Hobbs 2000). Chronic maintenance, if undertaken, would perpetuate the problems of soil disturbance and the introduction of seed of alien species that take advantage of disturbance. Equipment used to construct fuelbreaks and for group selection logging may transport the seeds of invasive species into areas where they were not formerly present. The establishment of non-native invasives in fuel breaks may provide an exotic seed source in close proximity to intact wildland areas. These wildland areas may then be more susceptible to invasion, particularly following disturbances such as natural or prescribed fires (D'Antonio 2000). Exotic species spread in fuelbreaks needs to be disclosed as an unavoidable impact since it is not known to be preventable (see http://www.werc.usgs.gov/fire/seki/frm/). Of particular concern in the Sierra is the invasion of Scotch Broom, which has severely degraded extensive areas by forming near-monocultures (Bossard et al. 2000). Seed of these brooms is spread readily by foot traffic and machinery (Swezy and Odion 1997). Once established, broom may be impossible to eliminate. Broom is	The potential to introduce and spread noxious weed species is recognized and addressed in the Noxious Weed Risk Assessment for the Creeks Forest Health Recovery Project (FEIS, Appendix B). The Creeks Project was surveyed for noxious weeds and known sites were documented and treated where possible. All new and known treatable occurrences of noxious weeds have been under going treatment since their discovery, and will continue to receive annual treatment until these sites are eradicated. Integrated Design Features for the alternatives (FEIS, Chapter 2) were designed to reduce the potential for introduction and spread of existing weed infestations throughout the project area. Noxious Weed Integrated Design Features include the washing of equipment prior to moving into a sale area and equipment must also be washed when moving from an infested area to an uninfested area within the project area (timber sale contract clause) to prevent the transport of weeds by equipment throughout the project area. Post-project monitoring and treatment activities would also assist in the detection of new introductions and spread of existing populations. In addition, all known noxious weed sites along roads where DFPZ units would be constructed are being actively treated and would continue to be treated throughout project implementation so that no new weed sites become established. Bossard et al. (2000) describes Scotch Broom as being prevalent in Eldorado, Nevada, and Placer counties in the Sierra Nevada foothills. Within the Lassen

Comment #	Comment	Response
	further spread by fire (Odion and Haubensak 1997). The activities proposed in the Creeks Vegetation Mangement Project appear well-suited for spread and establishment of broom networks, from which the noxious weed can spread further. This could increase fire hazards due to the combustibility of broom (http://www.cdfa.ca.gov/phpps/ipc/ weedinfo/brooms.htm), much like the growth of chaparral does. In sum, the FEIS fails to disclose the potential for impacts from the preferred alternative that could result in severe and irreversible degradation of ecosystems via the promotion of alien species invasions.	National Forest there are only five known occurrences of Scotch Broom, only one of which has not yet been eradicated, and this occurrence is found within the Hat Creek Ranger District at the northern edge of the forest. The closest known Scotch Broom site to the Creeks Project area is found on private land on the eastern shore of Lake Almanor and is approximately 12 air miles from the project area. There has never been a known occurrence of Scotch Broom found within or adjacent to the project area on either Forest Service or private lands. While it has been shown that Scotch Broom is spread by fire, since there are no known occurrences within the project area, the likelihood of this occurring is remote and post-project monitoring as well as other Integrated Design Features were developed to ensure that new infestations do not become established prior to or after project activities. Finally, the potential effects of noxious weed invasion from project activities are discussed within the Noxious Weed Risk Assessment for the Creeks Project (FEIS, Appendix B).
Economics		
11-2	In the FEIS, it would enhance the efforts of Table S-1 if you were to include two additional columns to each prescription to show the estimated volumes of merchantable sawlog and bio-mass that will be developed under each of the prescriptions.	Thank you for the suggestion. Volume estimations are included in the economic analysis in the FEIS (Chapter 3, Economics). Detailed volume estimates by treatment prescription are contained in the project file.
11-5	Tables S-9 and 3-50 are the most important tables in the draft because they demonstrate the importance of the Creeks project to the social and economic wellbeing of the citizens, businesses and local governments in Plumas and surrounding counties. In future projects and the final EIS for this project, it would provide important information to the reviewer if the tables were expanded to include the sawlog volume by species, harvesting methods and resource management activity. Since the biomass has value when delivered to a local power plant, it is important to include the merchantable volume of biomass to be removed along with the average FOB delivery price. Sawlog volumes should be presented in board feet measures and biomass in m bone dry tons measure. Rather than just stating jobs will be "generated", it is important to specify the estimated number of jobs created in the woods and the sawmill and power plant facilities. In addition to the primary direct jobs, what are the secondary indirect jobs generated by this project? The Final EIS for the QLG Pilot Project stated that for every thousand board feet of merchantable sawlog volume developed, $1,140 of economic activity would be generated. Is this economic factor still valid and what is the economic activity anticipated from the Creeks project?	Estimated volume for the alternatives is included in Chapter 3 of the FEIS (Economics section). An estimate of the number of equivalent year round positions and employment related income that would result from the alternatives has been added to the Economic analysis in the FEIS (Chapter 3).
11-9	Under the 5th cause for Purpose and Need of the project on page 28, I suggest that the "the most cost-effectives means available" was not placed in the Act to just take care of the financial needs of the "government" but rather all parties associated with the pilot project. Although it is true that the sum total cost to contractors to comply	The Responsible Official will take into consideration all the potential effects including the cost effectiveness of the alternatives at the time of the decision.

Comment #	Comment	Response
	with the numerous conditions of a project and contract reduce the total revenues that are developed for the Treasury, the key to "cost-effectiveness" is the application of sound forest management practices and the reduction of punitive and costly "constraints" on the various contractors operations. For starters, eliminate or dramatically reduce the Limited Operating Periods that restrict the operating days for this project.	
11-20	Chapter 3. Affected Environment and Environmental Consequences covers 164 pages or 63% of the DEIS and yet only 1.5 pages cover the social and economic affects of this project on the citizens, businesses and local governments of Plumas County. Although the scant information provided is important and useful, it would appear that people should get a higher percentage of analysis since they too are a major part of the environment affected by this project. It is especially important that the Alternative – 2 consider the social and economic aspects of a no action alternative.	The information present in the economic section of Chapter 3 (FEIS) provides information for the Responsible Official to consider in making a decision. This section of the FEIS has been expanded to include an estimate of the number of equivalent year round positions that would result from the alternatives.
17-55	The summary of economic effects table 2-10 perpetuates a myth that has crippled forest management in the Sierra-Cascade for 100 years. "This alternative proposes no action and produces no economic outputs." According to the Sierra Nevada Ecosytem Project, "From the perspective of gross revenues generated from natural resources, water is the most valuable commodity, followed by timber, livestock, and other agricultural products. Based on estimates of direct resource values as one input (not the total revenue produced by resource dependent activities), the Sierra Nevada ecosystem produces approximately $2.2 billion worth of commodities and services annually. Water accounts for more than 60% of that total value. Other commodities account for 20% as do services." For the Forest Service to say that this region would produce no economic output if the Creeks timber harvest project alternative is not chosen is a destructive position. The water flowing through Creeks obviously has ecological value that provides grazing vegetation for allotments and recreational value to local residents and tourists. The downstream uses of this water are much more valuable than the timber that may be exploited by well placed contractors. By focusing on timber, the USFS looses the opportunity, the responsibility, to quantify and capture a portion of the most precious commodity value that dominates the reality of the Sierra; WATER. The SNEP report goes on to say: "Around 2% of all resource values are presently captured and reinvested into the ecosystem or local communities through taxation or revenue sharing arrangements. The declining status of some aspects of the Sierra Nevada ecosystem suggests that this level of reinvestment is insufficient to ensure sustainable utilization of the ecosystem." http://ceres.ca.gov/snep/pubs/web/PDF/VIII_C23.PDF	Chapter 3, Watershed, Fisheries, Soils section of the FEIS contains a full disclosure of the effects of the alternatives on watershed resources, including the beneficial uses of water.

Comment #	Comment	Response
	I'm sure that comment reviewers are familiar with these facts. I suspect that reviewers may find my presentation of the SNEP findings "outside the scope of this project review." But the DEIS authors insisted on inserting the absurd assertion that economic output is totally dependent on timber industry values. The value of water must be emphasized and lobbied for by the USFS leaders and land managers.	
27-19	The economic analysis in the DEIS fails to adequately analyze the project. While information on the economic contribution to private timber companies is present, the arguably more important information about the costs and revenues of the project for the Forest Service are not adequately included. Please include a full accounting of the costs of the project, including preparation, administration, layout, analysis, slash piling and burning, and costs of later brush reduction and precommercial thinning of conifer regrowth 10-20 years post-treatment, as well as anticipated direct timber sale revenue to the Forest Service from the project.	The economic analysis in the FEIS (Chapter 3, Economics) contains the requested information. Additional information is available in the project file.
31-16	New roads will be created for this project. Road closure generally is ineffective, and [...] forest thinning facilitates entry into these areas (Preston, 2002). The cumulative impact of creating new roads [on hairy woodpeckers], the ineffectiveness of road closure and the expense of decommissioning roads must all be addressed in the DEIS.	Road closures in the project area are designed to be effective in reducing vehicular traffic off of non-system roads. The FEIS (Chapter 3, Wildlife section) contains a discussion of the effects of the project on pileated and hairy woodpeckers. The cost of road decommissioning is included in the FEIS (Chapter 3, Economics section).
Range		
1-5	All grazers should be removed from this area. grazing is extremely negative environmentally. these cattle barons move their cattle in to destroy and they get el cheapo rates that they have to pay to use taxpayer land. let these cattle barons take their cattle to the open private market and pay those rates. it is time that taxpayers stop taking on the burden from these environmentally destructive cattle barons. letting them pay el cheapo bottom of the line rates is also disturbing and i see no reason for that to continue anywhere in America.	Noted. Please refer to the purpose and need for all action alternatives, Creeks Project FEIS (Chapter 1). The proposed action is intended to achieve desired fuels conditions on the areas treated, and decisions regarding existing grazing authorizations are outside the scope of this analysis. As discussed in the Range Section of the FEIS, basic resource protection is provided for the active allotment within the Creeks Project Area through the attainment of standards and guides contained in the Lassen National Forest Land and Resource Management Plan, as amended, which provides direction on rangeland resources. Reviews to evaluate the site-specific impacts of grazing activities, in conformance with the National Environmental Policy Act (NEPA) have been scheduled on the allotments and at that time, upon completion of the scheduled NEPA analysis, decisions are expected to be made regarding existing grazing management. Allotment administration costs and fees for grazing are also outside the scope of this analysis, since congress sets the grazing fees and determines the yearly budget for range administration.
1-9	We do not want any additional "forage" created. such manipulation should be banned.	Please refer to the purpose and need for the Creeks Project FEIS (Chapter 1). The proposed action is intended to achieve the desired conditions on the areas treated through reductions in surface fuels, ladder fuels, and crown fuels, not create additional forage although this may be an ancillary benefit. As discussed in the Range Section of the FEIS (Chapter 3), in most cases grazing areas occur outside of forested areas. The proposed project could have a positive effect on rangeland

Comment #	Comment	Response
		availability and health but there are no existing plans to expand these allotments or increase the numbers of permitted animals on any allotment as a result of this project.
3-1	Page 197, Vegetation Monitoring and Use, first sentence The sentence "Available forage species for cattle on the allotments includes herbaceous riparian vegetation in meadow and occasionally near streams and wetlands..." implies that some grazing is allowed within riparian areas along streams and other surface-water bodies. The potential impacts of cattle grazing within riparian areas, including delivery of nitrogen and bacteria from feces, and streambank damage and sediment delivery, commonly is of concern. Therefore, consideration should be given to incorporating appropriate best management practices, including preventing access of cattle to sensitive riparian areas.	Region 5 has implemented the Best Management Practices Evaluation Program (BMPEP) at randomly selected sites since 1992. On the Almanor Ranger District, one active allotment is generally selected per year for an evaluation using BMEP On-Site Evaluation Form G24 and following protocols outlined in Investigating Water Quality in the Pacific Southwest Region: Best Management Practices Evaluation Program (USDA-FS, PSW Region 1992). The Best Management Practices (BMPs) applicable to the grazing program are: BMP 7.1 (watershed restoration to improve water quality and soil stability); BMP 7.3 (protection of wetlands to avoid adverse water quality impacts associated with the destruction or modification of wetlands), BMP 7.7 (management by closure to use (seasonal, temporary or permanent) to exclude activities that could result in damages to either resources or facilities resulting in impaired water quality), BMP 8.1 (range analysis, management planning and permit administration to safeguard water quality under perpetual production and forage harvest by livestock), BMP 8.2 (controlled livestock numbers and season of use to safeguard water quality under perpetual production and forage harvest by livestock). As discussed in the Range Section of the FEIS, management of the active Soda Creek/North Butte Allotment within the Creeks Project Area has been adapted to address riparian concerns by applying a grazing system keyed to moving livestock, with the use of fenced pastures, and a reduced stocking rate. Current permit administration of this allotment also includes monitoring of herbaceous utilization, woody utilization, and streambank disturbance (streambank alteration or comparable measure). These elements are monitored annually at the locations selected for allotment compliance (key areas) and basic resource protection is provided for through the attainment of standards and guides contained in the Lassen National Forest Land and Resource Management Plan, as amended. Adaptive management is achieved by addressing the corrective actions included in monitoring reports as well as with on the ground actions such as riparian fencing. Several sensitive riparian areas have been fenced and additional areas are currently being evaluated for future projects.
Recreation/Visual Resources		
6-4	The Pacific Crest Trail is one of the crown jewels of Calif. Please leave it in peace.	The PCT would be protected as described in the Integrated Design Features for the alternatives (FEIS, Chapter 2).
20-1	We at the PCTA [Pacific Crest Trail Assoc.] do not feel that the DEIS properly addresses our concerns in regards to protection of the Trail and the experience of the user. We are particularly disappointed that our reasonable requests to substantially	Thank you for pointing out that we misinterpreted your scoping comment. Alternative 6 has been dropped from the FEIS. See also response to comment 20-3.

Comment #	Comment	Response
	eliminate the impact of vegetative manipulation on users of the Pacific Crest Trail in this proposed project have been dismissed without due consideration. The request made during the scoping process was not that group selection units be eliminated within ¼ mile of the PCT as portrayed in Alternative 6. Rather, we asked that the agency use their internal Visual Management System and excellent design skills to meet a fairly stringent standard for protection of the PCT experience. Our staff's experience with timber management activities leads us to believe that there is no reason that the agency cannot design group selection units and other management activities within the foreground of the PCT that result in no impact on PCT users. We feel the PCT and experience of the user can be protected while still meeting the treatment objectives laid out in the proposal. To claim that Purpose and Need statements 1-5 would not be met is frankly unsupportable.	
20-2	To claim that the lack of standards and guides providing an outright prohibition on management activities proximate to the PCT is a mandate to pursue such activities regardless of their impact on the public shows a shocking disregard for the valuable experience that the public seeks along the PCT. The specifics of the current forest plan do not release the agency from the direction in the National Trails System Act to preserve the nationally important recreational experiences along the PCT.	Possible changes to the Forest Plan are outside the scope of the Creeks Project analysis. The PCT would be protected as described in the Integrated Design Features for the alternatives (FEIS, Chapter 2).
20-3	We do not believe that sufficient design work in terms of the size, shape, and location of units and associated roads has been performed to assure the protection of the Pacific Crest Trail experience as envisioned in the Act. We offered in our scoping comments to meet and work with the planning team for this project; however no significant contact has been made at this point. Again, we would offer to discuss our concerns and move to a resolution that would meet the important goals of this project, and the protection and management needs of the Pacific Crest National Scenic Trail. We would specifically request that design work be completed along the PCT that would meet a foreground VQO of retention and a middleground VQO of partial retention. We think that an optimal resolution of these issues would provide for excellent forest health within the watershed, and would allow PCT users to pass through a natural appearing landscape with little or no discernable sign of overt management activities. We are firmly convinced that adopting this goal and working with PCTA to achieve it, would lead to the "greatest good for the greatest number" as the Forest Service has been proclaiming as their mission in their centennial year.	Additional analysis has been conducted in the Recreation section of the FEIS (Chapter 3) that includes a 3D analysis of the viewshed as seen from the PCT.
29-41	The clearcuts and thinnings proposed within sight of the Pacific Crest Trail, along the Grizzly and Soda Creek trails and at the trailhead of the Peacock Point trail are very unfortunate. You state, "a few groups could be visible from the PCT, however; they would be on the slope below the observer eye level. In this case, most cutting units would have vegetative screens in the foreground as they are looking down upon	Clearcutting is not included as a management activity in the alternatives (FEIS, Chapter 2). Please also see response to comment 20-3.

Comment #	Comment	Response
	them. They would appear as natural openings, but in some instances appear clustered together. " (DEIS, pg. 213). You do the hiking, recreating public an injustice to infer they will not notice these clearcuts! Some of the GS near the PCT are in small roadless areas you plan to helicopter log. These groups must contain very valuable large trees to justify the expense of helicopter logging, especially to the detriment of these preciously few non-roaded areas within the project area. These big trees, and uncut forest are exactly what draws people to hike the trails of our National Forests. The wildlife dependent on these uncut forests is exactly what draws people to hike these trails. Again, you are not taking responsibility for the huge economic benefit of other resources our forests provide, like recreation. "The group selection harvest of small old forest areas or individual old trees represents an irreversible commitment of resources" (DEIS, pg. 216) with irreversible degradation of habitat and viewshed.	
Creeks FHR Project DEIS Analysis		
27-20	Please fully analyze an alternative that contains the following features in order to meet your stated purpose and need of increasing fire-resistant pine to create a more fire-resilient forest: a) no removal of ponderosa or sugar pine sawtimber (except clearly diseased and dying, or dead trees in excess of large snag retention); b) no group selection units on slopes where the forest is unlikely to regenerate pine, such as north-facing slopes, and slopes above 5,500 feet in elevation generally (and south-facing slopes above 6,000 feet); c) require whole-tree yarding for all trees in all units, both DFPZ and group selection; d) no removal of trees over 20" dbh outside of any Defense Zone units; and e) piling and burning of slash debris WITHIN the group selection and DFPZ units will be required during the first fall or spring following completion of logging in any given unit (to be required of the timber sale contractor).	Alternative suggestion: This Alternative was added for consideration by the Responsible Official, refer to Alternative 13 Chapter 2 of the FEIS.
Errors and Inconsistencies		
11-1	On pages 9, 10 and 27 under the Purpose and Need section, the writers of the draft document have misrepresented the intent of using Group Selection as one of the authorized resource management activities under the Act. Although merchantable sawlog and biomass volumes will result from the proper implementation of groups, the legislative purpose and need for the activity is "Utilization of group selection and individual tree selection uneven-aged forest management prescriptions described in the Quincy Library Group Community Stability Proposal to achieve a desired future condition of all-age, multistory, fire resilient forests." And not "timber harvest" or "mosaic of timber stands". Since this project will be attacked by the enviros with appeals and subsequent lawsuits, it is imperative that you get the correct purpose and need established in the FEIS and Record of Decision.	The requested correction was incorporated in Chapter 1 of the FEIS.
11-6	Under Table S-12, Trails, why don't you turn the "heavily impacted" negative	The word "heavily" will be stuck from this summary. We agree that the project does

Comment #	Comment	Response
	statement into a positive opportunity to educate the trail users about the fuel reduction and forest restoration benefits of the Creeks project and the QLG Pilot Project?	present opportunities to educate the public about the goals and objectives of this project.
25-1	Based on our review, we have rated the DEIS as Environmental Concerns - Insufficient Information (EC-2). We have concerns about impacts to water and air quality, potential environmental justice impacts, and consultation with tribal governments.	The FEIS contains expanded discussions regarding the environmental effects to water and air quality, environmental justice impacts, and consultation with tribal governments.
25-4	Environmental Justice Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 11,1994), directs Federal agencies to identify and address disproportionately high and adverse human health or environmental effects on minority and low-income populations, allowing those populations a meaningful opportunity to participate in the decision-making process. The DEIS does not provide information on minority or low-income populations that may exist in the project area, potential impacts to these populations, and efforts to coordinate with them. The community of Jonesville and the Philbrook Lake home sites are cited as areas with a high threat of wildfire, and that smoke from intense, severe wildfires would create both nuisance and health concerns in these communities for considerable durations (p. 96). No information is provided on the populations living in these communities. Guidance by the Council on Environmental Quality (CEQ) clarifies the terms low-income and minority population, which includes Native American, and describes the factors to consider when evaluating disproportionately high and adverse human health effects (Guidance for Federal Agencies on Key Terms in Executive Order 12898, December 1997). Recommendation: The FEIS should describe where low-income and minority populations are located, the ethnic make-up of the minority populations, and the sources from which that information was obtained. An assessment of the project's impact on minority and low-income populations should be described and should reflect coordination with those affected populations. The FEIS should describe additional mitigation measures developed to reduce impacts to minority and low-income communities. The FEIS should also estimate the environmental benefits of those mitigation measures.	Information on minority or low-income populations and potential impacts to these populations has been included in Chapter 1 of the FEIS.
25-5	Consultation and Coordination with Indian Tribal Governments Executive Order 13175, Consultation and Coordination with Indian Tribal Governments (November 6, 2000), was issued to establish regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, and to strengthen the United States government-to-government relationships with Indian tribes. The Sierra Nevada Forest Plan Amendment (SNFPA) Final Supplemental Environmental Impact Statement	True, the full results from consultation were not included in the DEIS. The FEIS in Chapter 4 contains a description of consultation and coordination with local tribes. After written and verbal tribal consultation only one response was received. This response is noted in the summary of comments received from scoping and is located in the project file.

Comment #	Comment	Response
	(FSEIS) Record of Decision (ROD) states that the Forest Service will work with tribal governments to develop mutually acceptable protocols for government-to-government consultations, and that tribes will be consulted regarding sacred and ceremonial sites, tribal traditional use areas, and other issues of tribal concern. The DEIS states that scoping was conducted to determine if interested public or tribal parties had specific knowledge or concerns for heritage resources that could be affected by project activities. Outside of the scoping process for this specific resource, there is no indication of communication or coordination with tribal governments, and no description of the government -to-government process specified in the SNFPA FSEIS ROD. Recommendation: The FEIS should describe the process and outcome of government-to-government consultation with the tribes in accordance with Executive Order 13175.	
30-1	I have reviewed portions of the DEIS out of an interest in ecologically sound management of public lands. I believe the DEIS is inaccurate and misleading in its depiction of this project and fire ecology in general. Problems include inadequate disclosure, failure to address impacts to fire hazards and ecological resources, and failure to provide a range of alternatives.	The FEIS contains a full disclosure of the consequences of the alternatives. An additional alternative has been included in the FEIS (Chapter 2), and one alternative that was considered but eliminated from detailed study. Therefore, a number of alternatives were considered, but dismissed from detailed consideration for reasons described in the FEIS (Chapter 2).
32-35	To comply with NEPA, an EIS must discuss the environmental impacts of past, present, and proposed logging; a mere listing of projects and acreage, in the absence of specific analysis of the environmental impacts of the projects, is inadequate. "[T]he general rule under NEPA is that, in assessing cumulative effects, the [EIS] must give a sufficiently detailed catalogue of past, present, and future projects, and provide adequate analysis about how these projects, and differences between the projects, are thought to have impacted the environment." The Lands Council, 379 F.3d at 745. In particular, the EIS must include "discussion of the connection between individual harvests and the prior environmental harms from those harvests." Id. at 744. The EIS also needs to provide "adequate data of the time, type, place, and scale of past timber harvests." Id. at 745. It is essential that the cumulative effects analysis provide "quantified or detailed information; ... [g]eneral statements about possible effects and some risk do not constitute a hard look." Klamath-Siskiyou, 387 F.3d at 993. Thus, for example, EISs need to include "quantified assessment" of the "combined environmental impacts" of the various projects considered, id. at 994. Not only does the cumulative effects analysis need to provide quantified data with respect to factors such as the amount of spotted owl habitat that will be affected, id. at 994 n.l, but "the effect of this loss on the spotted owl" throughout the planning area also needs to be analyzed. Id. at 997. The Creeks DEIS falls far short of these standards. Thus, for example, with respect to past logging on national forest lands, the EIS merely lists the names and total	The FEIS (Chapter 3, all resource sections) contains a full disclosure of cumulative effects.

Comment #	Comment	Response
	acreage of various projects within the analysis area. (DEIS, pp. 240-41). The DEIS provides no information about the nature of past logging, such as the standards and guidelines used, but rather only describes the logging as "timber harvest." Id. Completely absent from the EIS is any analysis of the environmental impacts of these projects, the amount of habitat that was lost or degraded, or how this loss of habitat affected sensitive species such as the California spotted owl or American marten. Because the Creeks DEIS entirely lacks "discussion of the connection between individual harvests and the prior environmental harms from those harvests," it falls short of NEPA's requirements. The Lands Council, 379 F.3d at 744. The discussion of present and proposed logging on national forest lands is similarly flawed. Although the EIS provides the names of the projects on national forest lands and their acreage, it lacks any analysis of the environmental impacts of the projects, including the "quantified assessment" of "combined environmental impacts" required by NEPA. Klamath-Siskiyou, 387 F.3d at 994.	
Maps		
17-45	Decommissioned "ditch road" shown as existing road. *(Comment includes several photographs of road)*	Because this road is not an included action within the Creeks Project the comment is beyond the scope of this analysis and is not substantive, but we will correct the roads analysis.
17-47	Photograph of closed roads designated as existing (off of 27N35 sec. 28)	Refer to comment 29-18
17-48	Photograph of Decommissioned creek side road shown as temporary.	Refer to comment 29-18.
17-49	Photograph of Skid road shown on map as existing road. The road below needs culvert maintenance.	Thank you for pointing out the error in the map. The corporate layer for roads incorrectly displayed the new location of the system road at the terminus with road 27N65, and instead showed the old road location. This road segment was re-routed and replaced by the new location. The FEIS map will show the correct location of the Forest system road.
29-18	Three photos of roads in sections 7, 8, and 17 of T26N R6E shown as open on FS maps that are overgrown/decommissioned. They cross a tributary of Grizzly Creek and are near a SOHA.	One method used to reduce maintenance needs and sources of sedimentation from less used roads is to classify the road as a maintenance level 1 and temporarily close the road when it is not needed for management purposes. As noted by commenter, the roads in the photos have been out of use (closed) for several years. These Maintenance Level 1 roads remain forest system roads and can be re-opened and used when needed for management activities, and then closed again.
29-20	There is a road in T27NR6E section 20 right next to Butt Creek off 27N43 that is shown as open on the map. It has a berm at one end and the other end is on private property. This road is shown as decommissioned on our Creeks roads analysis map.	This comment is in error on three points. 1. Not all forest system roads shown on the Lassen National Forest visitor map are open. Many roads on the map are Maintenance level 1 or 2 and may be closed. 2. The Creeks Forest Health Recovery Project Area Roads Analysis considered resource management needs within the analysis area and proposed activities for each road. Not all activities identified in the roads analysis were brought forward into the proposed action. Activities proposed range from "No proposed change to road" to

Comment #	Comment	Response
		"Decommission" to "New Construction". Activities shown on the roads analysis are not decisions, but opportunities for the Responsible Official to consider. Many miles of roads were noted for potential decommissioning, with comments that indicate the road should be evaluated for future decommissioning. The road in question is currently in Maintenance level 1 (closed with the berm), and is proposed to evaluate for decommissioning at a future time. 3. The road does not end on private property. This land was acquired by the Lassen National Forest through a land exchange.
33-10	Figure 1, Map of Creeks project units in relation to Old Forest Emphasis Areas, CSO Areas of Concern, and the Furbearer Network.	The land allocations for Old Forest Emphasis Areas and marten and fisher habitat management areas do not apply to projects within the HFQLG pilot project area (2004 SNFPA ROD, p 67). CSO Areas of Concern are not a land allocation. Effects of the alternatives to California Spotted Owls and their habitat within the CSO Area of concern are discussed in Chapter 3, Wildlife section of the FEIS.
33-11	Figure 2, Map of Creeks project units in relation to California Spotted Owl Protected Activity Centers and Home Range Core Areas.	Effects of the alternatives to California Spotted Owls and their habitat within the CSO Area of concern and Home Range Core Areas are discussed in Chapter 3, Wildlife section of the FEIS.
33-12	Figure 3, Map of Creeks project boundaries and Areas of Concern for California Spotted Owl.	Refer to comment 33-11.
Comments Not Considered Substantive		
1-1	I think the comment period should be extended. the time allowed for a working public to comment and to comprehend what is contemplated should never be 30 or even 60 days. 90 days is a minimum time that should always be given for the true public. profiteers, of course, will step up to the plate probably within 2 days if they smell money for their wallets.	For a proposed action that is analyzed and documented in a draft EIS the opportunity to comment ends 45 days following the date of publication of the notice of availability in the Federal Register. This comment period is determined by 36 CFR Part 215, 215.5(b)(v).
1-2	Logging for the possibility "something" may happen makes absolutely no sense at all	Action alternatives were designed to meet the Purpose and Need for the project, as described in Chapter 1 of the FEIS.
1-11	Rushing to stumpify the forest that national taxpayers have paid taxes for eons to support is an insult to american taxpayers.	Action alternatives were designed to meet the Purpose and Need for the project, as described in Chapter 1 of the FEIS.
1-12	i notice much very very old alleged "research" cited in this report. it is out of date, obsolete and does not represent america in 2005 to cite alleged research from 1961, when america was a far different, smaller place.	This comment does not specify which citations are considered out of date.
1-13	The following should be banned in the area: I. huntting 2. trapping 3. new roads 4. all burning 5. all grazing 6. all logging 7. all mining.	Management direction for the project area is set forth in the Lassen National Forest Land and Resource Management Plan (LRMP, 1993) as amended. None of the activities listed in this comment are prohibited in the project area.

Comment #	Comment	Response
2-1	Why do you continue to show such disrespect for nature and what we have found to be so beneficial to our heritage? Trees, wilderness, streams, wildlife do not have a voice and their history is not written in words but we humans know as facts ecology is essential for our future development... why are you so shortsighted in your concerns? I don't understand how you can live your life with blinders and not realize your decisions are so selfish and narrow minded. Please consider the fuel reduction in Lassen Forest a reactionary edict that may not be the best answer for the long term and that politics may be playing an unwise game with our natural resources.	All alternatives were designed to meet the Purpose and Need for the project, as described in Chapter 1 of the FEIS. Management direction for the project area is set forth in the Lassen National Forest Land and Resource Management Plan (LRMP, 1993) as amended.
4-1	Please consider the ecology of the forest when making decisions about cutting down the trees... The animals do not have a voice but their habitat is being destroyed at such a massive and alarming rate and it isn't fair our children and future generations will not be able to enjoy fishing, hiking, hunting and the wild outdoors like our generations have. I have been fishing and hunting throughout this region for over thirty years and it's so sad to see the decline of the forests environment due to logging. The loggers, lumber companies, developers and their cronies in Washington DC, especially Wally Herger, have no vision and 20-50 yrs from now our kids will be facing such a devastating loss that could have been prevented had people thought about the future instead of what they could get quick and run.	Management direction for the project area is set forth in the Lassen National Forest Land and Resource Management Plan (LRMP, 1993) as amended.
5-1	As a Cohasset resident, and recent victim of a small but devastating logging project on my own ridge which is hideous to drive through, will raise local air temperatures, and has left lots of ground fuel, I am writing to decry the desecration of our forests, wildlife habitat, and recreational areas that is proposed by the project planned in the Almanor Ranger District. This plan does NOT focus on fuel reduction near mountain communities, as is proposed by The Lassen Forest Preservation Group (LFPG). Don't let money interests of special commercial groups take precedence over specific fuel reduction projects, recreational values and common-sense logging.Let values prevail over greed.	The alternatives were designed to meet the Purpose and Need for the project, as described in the FEIS (Chapters 1 and 2). Management direction for the project area is set forth in the Lassen National Forest (LNF) Land and Resource Management Plan (LRMP, 1993) as amended. This project is consistent with the LNF LRMP.
6-2	If this project is being pushed forward under the guise of "fire prevention", may I suggest you read the 2001 Sierra Nevada Framework and Record of Decision. It is my suggestion that you consider the expertise of scientists above the profit obsessed, unscientific ranting of politicians and the timber industry.	Management direction for the project area is set forth in the Lassen National Forest (LNF) Land and Resource Management Plan (LRMP, 1993) as amended. This project is consistent with the LNF LRMP.
6-5	Protect the wildlife, the water quality, the most mature forest habitats, and the quality of life, for all of us creatures. No clearcuts!	Clearcutting is not included as a management activity in the alternatives (FEIS, Chapter 2).
7-1	We are very concerned about the "Creeks Project". This very destructive plan of large scale logging is terrible. Fuel reduction, yes, that would be necessary—	Alternatives 1 and 14 of the Creeks Forest Health Recovery Project, include approximately 9,190 acres of fuels reduction through both DFPZ construction and Area Thinning.
7-2	Please protect Mt. Lassen for recreation—Wildlife and Water	Mt Lassen is not within the project area.
8-1	It is unthinkable to me that clear cutting and large areas of forest logged and left in disrepair will be what we leave for our grandchildren.	Clearcutting is not included as a management activity in the alternatives (Chapter 2).

Comment #	Comment	Response
8-2	The Lassen Forest belongs to the public, not to private interests with money and power to destroy. Let them log with common sense and you focus on fire reduction.	The alternatives were designed to meet the Purpose and Need for the project (FEIS, Chapters 1 and 2). Management direction for the project area is set forth in the Lassen National Forest (LNF) Land and Resource Management Plan (LRMP, 1993) as amended. This project is consistent with the LNF LRMP.
8-3	Remember why you first joined in the forestry service. It was probably because you love the outdoors, hiking, fishing etc.	Comment not specific to the Creeks Project.
9-1	The little "Nature Nooks" are way too small, leaving the animals no real protection. All predators know the prey has to be there in the only trees and brush available for cover. It's a death sentence or more probably, many. Picture yourself in the middle of an empty parking lot - no cover, no food, no shelter. If you make it to surrounding forests, someone has to die. The animals are very territorial. The clear cuts are horrible to see, horrible for all the creatures who lived there. And crowding the animals out of their homes makes animals deaths. They are driven from their home areas into another animal's territory. The company my husband worked for did a really good job thinning.	The Responsible Official will take into consideration all the potential effects from the alternatives at the time of the decision.
9-2	the loggers bury hazardous waste, machine parts, batteries, tires, plastic, oil buckets, etc. they cannot afford to take to the dump.	Conjectural. The Responsible Official will take into consideration all the effects from the alternatives at the time of the decision. The activities listed in the comment are prohibited on public lands and would also be prohibited under any Timber Sale of service contracts. Forest Service Certified Sale Administrators/Contracting Officer Representatives would be responsible for monitoring compliance with contract specifications.
10-1	I have been informed that the area has already been heavily impacted by the Storrie fire and subsequent clearcuts by private logging. I know this area to be especially beautiful in its natural form. I discourage impacting the area with more logging and road building. The area must be preserved to protect the habitat for many wild animals such as the spotted owl, deer, bear, goshawk and marten	A small part of the project area does overlap a part of the area that was burned by the Storrie Fire incident. Most of the areas that burned on private lands within the Lassen National Forest were subsequently salvage logged, and planted with tree seedlings. Thank you for your comment. The Responsible Official will take into consideration all the potential effects from the alternatives at the time of the decision.
10-2	I encourage you to implement a plan that follows the 2001 framework and Record of Decision. Fuel reduction, wildlife, water quality and healthy forests are top priority.	The inapplicability of the 2001 SNFPA ROD has already been decided (Creeks Project FEIS, Chapter 2). The 2004 SNFPA ROD replaced the 2001 SNFPA ROD in its entirety.
11-10	Under Public Involvement on pages 29 and 30, please note that I was one of the six respondents for the scoping phase and one of the eight (four original) respondents to the February 2005 announcement to change the Creeks EA to and EIS and one of the few respondents to this DEIS. As such, please be advised that I request to be notified when the obstructionist arm of the environmental community appeal this	Request to be informed is noted.

Comment #	Comment	Response
	project and I further request to be involved in all meetings and field trips that take place as a result of these appeals. Since I am employed by Plumas County to represent their social and economic interests in this and all QLG projects, it is imperative that I receive a copy of each of the forthcoming appeals.	
11-20	This project is scheduled to construct roughly 6,000 acres of DFPZ's in northeastern Plumas County and it is imperative that the GIS mapping of this network be incorporated into the Plumas County Fire Safe Council - County Fire Plan that was adopted by the Plumas County Board of Supervisors earlier this spring. Since efforts are underway by the QLG and the PCFSC to incorporate the DFPZ network in Plumas County with the efforts of Wildland Urban Interface (WUI) projects around the 52 at-risk communities in Plumas County, it would help if the Lassen GIS/Computer folks contact John Gay at the Plumas National Forest Supervisors office to get the data to the PCFSC. Plumas County is the only county in the west that is able to bring this scale of fuel reduction and fire protection together in one plan and it is important that you move quickly with this GIS mapping information for the Creeks and other QLG projects in Plumas County.	Information request noted.
12-1	For years we have treasured our trips to Deer Creek, Chico Creek, Almanor and Mount Lassen. Several families meet there. I have just learned about the "Creeks Project"! that would be a terrible loss to all of us!!! Some fuel reduction is necessary, but please hold it to that!	Neither the Deer Creek or Chico Creek Watersheds, or creeks that flow into Lake Almanor are within the project area. Mount Lassen is not within or adjacent to the project area.
13-1	We completely support the forest management plan as proposed in the "Creeks Project". To maintain the health of this area the logging plan must go forward. While this plan is good, it does not allow enough clearing in some areas. There should be more clear cuts in some areas to thwart potential fire spread on some canyon walls. Get the loggers in there and working !!	Thank you for your support. The Responsible Official will take into consideration all the effects from the alternatives at the time of the decision.
14-1	The "Creeks Project", while getting painted with negative propaganda in the Chico area, is an important step in getting that part of Lassen National Forest in a safer, healthier position. We completely support the logging plan as proposed. In fact, I feel more "clear-cutting" on some ridge lines would provide even better fire control. The areas named in this plan are long over due for clearing of undergrowth as well as timber removal.	Thank you for your support. The Responsible Official will take into consideration all the effects from the alternatives at the time of the decision.
14-2	Access is also an issue that needs to improved into the Grizzly and Yellow Creek water shed areas to be logged. Rather then blocking those roads after harvest they should be left open to the public.	The Responsible Official will take into consideration all the potential effects from the alternatives at the time of the decision.
14-3	Much of the publicity in the local media is based on emotion, not fact. There's a paid ad in the Chico Enterprize Record that implies, very directly, that there is a choice surrounding these sales that would mean either logging in the creeks area, or fire suppression in the rest of the north state. Moreover, there's an implication that wildlife would suffer greatly due to the logging...in fact, the habitat would be much improved through out the sale area and the e-system will flourish.	Thank you for your support.

Comment #	Comment	Response
	While those placing the ad and asking for comment know this is not the case, they are simply trying to stir negative comment that will fit their agenda. However, any comments generated by the false information they provide can not be a part of any rational forest plan. The forests need to be managed with sound policies. This package does just that.	
15-1	Camping in the Humbug Valley has always been a special treat because of its beauty. I have seen deer, hawks, bears, and heard many types of birds in the area. The headwaters of Yellow Creek is also is a special place. When I heard about and subsequently saw the damage done by the Storrie fire, I was saddened. I was even more saddened when I saw the logging that was done in the area due to the fire. I think they took more than burned trees. (They were logging it when I was camping up there a few years ago.) Now clearcuts and heavy thinning are planned which is unsustainable resource extraction. I am asking you to support a plan that follows the 2001 framework and Record of Decision. I want you to know that there are many people who envision the Lassen Forests as a place where recreation, water quality, wildlife and fuel reduction come first. Please protect our special places.	Clearcutting is not a part of the proposed action. Thinnings are designed to retain sustainable levels of forest stocking. The inapplicability of the 2001 SNFPA ROD has already been decided (Chapter 2, FEIS). The 2004 SNFPA ROD replaced the 2001 SNFPA ROD in its entirety.
16-7	The DEIS [...] fails to analyze any alternative other than the Preferred Alternative and the No Action Alternative. An obvious alternative that should be analyzed is one based on the 2001 Framework (USDA Forest Service 2001). This would include management that specifies a smaller diameter limit for logging and higher canopy retention. Such an alternative would have a much less adverse impact on marten populations and habitat connectivity while meeting the project's purpose and need. By failing to analyze such an alternative or other alternatives with lower diameter limits and higher canopy cover retention standards, the DEIS does not clearly define the tradeoffs involved in deciding to implement this project and fails to offer a clear basis for choice among different options.	The inapplicability of the 2001 SNFPA ROD has already been decided (Chapter 2, FEIS). The 2004 SNFPA ROD replaced the 2001 SNFPA ROD in its entirety. The FEIS contains an additional alternative studied in full detail as well as a description of 10 additional alternatives that were considered but eliminated from detailed study. Therefore, a number of alternatives were considered, but dismissed from detailed consideration for reasons summarized in the FEIS (Chapter 2).
17-39	Photograph of SPI clearcut inholding; section 29 T27N R6E.	The effects of land management on private lands is considered in each of the cumulative effects section for each resource discussed in Chapter 3 of the FEIS.
17-50	Photograph of Cattle corral and meadow creek flowing on road.	No activities are proposed in the vicinity of this photo. The site is listed in the Chapter 3 Range section of the FEIS and is considered in the cumulative effects analysis.
17-54	Photograph Designated 'F & G' treatment, should be 'H' with 12"UDL to preserve habitat.	The inapplicability of the 2001 SNFPA ROD has already been decided (Chapter 2, FEIS). The 2004 SNFPA ROD replaced the 2001 SNFPA ROD in its entirety.
18-1	I strongly urge you to avoid heavy logging of the Butte, Yellow and Grizzley Creek watersheds near Humbug Valley in the Almanor Ranger District. This is an excellent hunting, fishing and hiking area. All these streams, and much of the wildlife habitat in this area will be severely impacted by 10,000 acres of logging including clear cuts, heavy forest thinning and more roads.	The Responsible Official will take into consideration all the potential effects from the alternatives at the time of the decision.
18-2	I urge you to follow a plan that follows the 2001 framework and Record of Decision.	The inapplicability of the 2001 SNFPA ROD has already been decided (Chapter 2,

Comment #	Comment	Response
		FEIS). The 2004 SNFPA ROD replaced the 2001 SNFPA ROD in its entirety.
19-7	Failure of the DEIS to consider viable alternatives other than the proposed action and no action sets up a false dichotomy between the preferred alternative and doing nothing. It is generally acknowledged by foresters, wildlife biologists and other professionals, that some thinning of the forest within the Creeks Project area is warranted. The choice to be made should not be whether to do one thing or do nothing. Rather, a variety of treatment options should be presented, including at least one that retains at least 40-50% canopy cover in all suitable owl foraging habitat, at least one option that limits the diameter of harvested trees to 20" or less, and at least one that does not include group selection harvesting. In particular, the EIS should model an alternative based upon the 2001 SNFPA, which incorporates several of these features. This would allow decision makers and the public to fairly evaluate a variety of timber harvest alternatives with respect to fire, insect pests, mistletoe, wildlife, recreational, and other considerations. The "Decision Framework" (DEIS p. 20) states the following: "Based upon the effects of the alternatives, the responsible official will decide whether to: 1) implement the proposed action, 2) meet the purpose and need for action through some other combination of activities, or 3) take no action at this time" [italics mine]. Under all alternatives, effects of fire should be modeled for all prescriptions; wildfire was not simulated in stands with group selection cutting only, which the DEIS acknowledges was possible (p. 93).	The FEIS considers an additional alternative that retains 40-50 % crown closure in selected CSO territories (Chapters 2 and 3, FEIS). The inapplicability of the 2001 SNFPA ROD has already been decided (Chapter 2, FEIS). The 2004 SNFPA ROD replaced the 2001 SNFPA ROD in its entirety.
21-1	I urge the Forest Service to reconsider this project and rather, to focus on a more environmentally conservative plan. Specifically, consider a project that places a stronger priority on recreation and water quality, fuel reduction, and wildlife.	Alternative suggestion not specific enough to quantify into an alternative. No significant Issue identified to develop alternative.
22-1	Unfortunately over the last four years I have noticed an huge increase in clear cutting in the local area. I cannot believe that such extensive clear-cutting is even economically sustainable, not to mention the environmental issues.	Clearcutting is not a part of Alternative 1, the Proposed Action, or Alternative 14 (Chapter 2, FEIS).
22-3	I sincerely hope that you will do what you can to rectify the current practices, and bring forest management practices into conformity with recognized environmental standards, including fuel reduction, recreational values, watershed protection and common-sense logging.	Please refer to comment 22-1. The Action alternatives included in the FEIS meet the standards and guidelines contained in the Lassen LRMP, as amended. These standards and guidelines represent recognized environmental standards. In addition, the alternatives contain Integrated Design Features (Chapter 2, FEIS) that were developed site specifically to reduce or avoid adverse environmental effects of the alternatives to forest resources.
23-17	CATs [Californians for Alternatives to Toxics] is alarmed by the suggestion of an allowance for incidental removal of trees for safety and operability regardless of diameter. Such an allowance would place the burden of potentially incompetent operators onto the forest. Furthermore, by providing such freedom to operators, the Forest is likely promoting a situation where an otherwise honest contractor may turn deceitful. Operators need to be held responsible for their actions. It seems extremely unlikely that the mobility of operators will be restricted under the proposed thinning strategies. The proposed standard is already generous by allowing for the	All trees larger than 30 inches that would be removed would be identified and approved for removal in advance by a Forest Service Certified Sale Administrator. We agree that relatively few trees would need to be removed to allow for operability.

Comment #	Comment	Response
	unsubstantiated removal of trees up to 30" DBH. Even after lowering the DBH to 20", this allowance seems more suited to providing ease of operability. By allowing for the removal of any trees, regardless of diameter, the Forest is requesting a great deal of faith and trust from the public that it has not earned. CATs feels this allowance will open the forest further, promoting the establishment of invasive and noxious plants, and contribute to a future vegetative state which is likely to be dependent on herbicide management.	
23-18	Review of scientific papers purported by the USFS to support lengthening timeframes for maintenance in Defensible Fire Protection Zones.	DFPZ maintenance for this project tiers to the HFQLG FSEIS and ROD, 2003.
24-1	The above [Creeks FHR] project of clearcutting and drastic thinning , if carried out, would be devastating to the watersheds of Butt, Yellow and Grizzley Creeks and to the plants, animals, birds, and human activity that takes place there.	The Responsible Official will take into consideration all the potential effects from the alternatives at the time of the decision.
24-2	I urge the concerned parties to choose a sustainable harvesting alternative and concentrate on fuel reduction closer to population centers.	Refer to comment 18-3
24-3	Please follow the 200l Framework and Record of Decision	The inapplicability of the 2001 SNFPA ROD has already been decided (Chapter 2, FEIS). The 2004 SNFPA ROD replaced the 2001 SNFPA ROD in its entirety.
26-1	The current concern relates to the project proposed by the Quincy Library Group in the Butt, Yellow, and Grizzley Creek watersheds near Humbug Valley. Given all of the different kinds of animals that would be endangered with the clearcuts, and with major thinning adjacent to popular hiking trails, I urge you to follow a plan that takes the 2001 framework into account.	The inapplicability of the 2001 SNFPA ROD has already been decided (Chapter 2, FEIS). The 2004 SNFPA ROD replaced the 2001 SNFPA ROD in its entirety.
27-22	For the foregoing reasons, we believe that the project fails to meet the requirements of the QLG Act to demonstrate the effectiveness of DFPZs, and fails to demonstrate the effectiveness of group selection to create a more fire-resilient forest, in violation of the QLG Act.	The comment is in error and is beyond the scope of a site-specific project. The HFQLG pilot project is to test the effectiveness of the management activities described in the HFQLG Act. The Creeks Project merely implements the Act, and the effectiveness of the Creeks treatments will be conducted during the evaluation of the pilot project as a whole.
28-6	The Sierra Nevada Forest Protection Campaign and the Sierra Club, in attempting to strike a compromise with the timber industry, proposed concentrating fuelbreak creation efforts within the wildland-urban interface zones, and succeeded in requiring that in the Sierra Nevada Forest Plan Amendments, allowing trees up to 30 inches in diameter to be logged within the defense zone of communities. In my opinion, this compromised the Sierra Club's campaign to End Commercial Logging on public lands; yet the Forest Service did not try to implement any significant percentage of fuel reduction projects under the 2001 Framework, and continues, with this project, to focus logging outside the WUI. I now consider that attempted compromise by the Sierra Club unwise, since the Forest Service ignored it, and because the same logic that dictates that the largest trees should be retained forest-wide also applies equally to the WUI. You should not be significantly reducing forest canopy cover that effectively suppresses brushy re-	Thank you for your opinion. The Responsible Official will take into consideration all the effects from the alternatives at the time of the decision.

Comment #	Comment	Response
	growth and maintains ground-level humidity! Studies such as that done by Dr. Scott Stephens (please see his February 28, 2004 Comments submitted to the U.S. House of Representatives Resources Subcommittee on Forests and Forest Health) show that merely removing ground fuels and dense fuel-ladders, followed by controlled burns, effectively reduces the likelihood of wildfires becoming catastrophic crown fires. Private lands in the WUI are already threatened with removal of their largest trees both because of short-term profit-seeking, because larger trees have wider root-spread more easily compromised by building and grading activities, and because those generally older trees tend to have more defects making them hazardous to structures. We should be able to expect that at least on our public lands the largest and oldest trees will be allowed to live out their hundred to thousand-year lifespans without being threatened by human enterprise.	
28-7	Please [...] meet the spirit and law of the documents you are mandated to follow; and show us you really will protect the largest trees. Please give us reason to trust the Forest Service again, so that we don't have to try to end all commercial logging on public lands.	As described in the alternatives section of the FEIS (Chapter 2), trees larger than 30 inches dbh would be retained except as necessary for operability, and impacts to trees larger that 30 inches dbh would be minimized as much as practicable.
29-6	We asked for a forest-wide analysis for the CSO that we did not get. There was no mention of the huge North 49 project planned in the Hat Creek RD in owl territory, or of the Warner, Battle, or Silver DFPZs all in old forest emphasis areas.	A forest wide analysis for individual species is beyond the scope of this project. Appendix A of the FEIS describes past present and reasonable foreseeable future actions considered in the cumulative effects analysis for the California Spotted Owl. Cumulative effects at a broader scale were considered in the 2004 SNFPA FSEIS and ROD.
29-43	LFPG and the Sierra Club support the goal of reducing the risk of catastrophic wildfire. The 2001 framework outlined a common sense approach to fuels reduction, focusing on areas near communities and using sound science for management direction. This Creeks DEIS has failed to demonstrate that the intensity of proposed logging is needed to achieve this goal. The loss of habitat, recreation, water, and wildlife value cannot justify the supposed economic or fuel reduction benefits of this operation.	The inapplicability of the 2001 SNFPA ROD has already been decided (Creeks Project FEIS, Chapter 2). The 2004 SNFPA ROD replaced the 2001 SNFPA ROD in its entirety. The Responsible Official will take into consideration all the potential effects from the alternatives at the time of the decision.
30-17	Photo of a portion of a DFPZ on the Lassen NF showing heavy soil disturbance.	Comment not site specific. Location of photo unknown, probably not taken within or adjacent to the project area, and does not illustrate the implementation of DFPZ prescriptions included in this project. The FEIS contains a photograph of a typical DFPZ prescription implemented through a previous project (Chapter 3, Silvicultural Resources section).
32-1	These comments on the Creeks Forest Health Recovery Project Draft Environmental Impact Statement (DEIS) are submitted on behalf of the Sierra Nevada Forest Protection Campaign and the Sierra Club. We have previously submitted comments on this project, dated July 9, 2004 and March 15, 2004, and hereby incorporate these comments by reference. The Creeks project implements the 2004 Sierra Nevada Framework ROD (USDA Forest Service 2004a), and tiers to the accompanying FSEIS (USDA Forest Service	Comments are not specific to the Creeks FHR Project.

Comment #	Comment	Response
	2004b). As demonstrated in our appeal of the 2004 ROD and FSEIS (SNFPC et al. 2004), both the 2004 plan and the FSEIS fail to comply with the National Forest Management Act, the National Environmental Policy Act, and other environmental laws. Therefore, for the reasons set forth in our appeal of the 2004 ROD and FSEIS, the Creeks project as currently designed is also contrary to law.	
32-6	According to the DEIS, a key purpose of the Creeks project is to reduce the risk of catastrophic wildfire and promote healthier forests. (DEIS, pp. 9-10). Yet the DEIS fails to consider a range of logging plans that could achieve these goals, and instead only considers the proposed action and no action. This failure to explore all reasonable alternatives makes it impossible to assess resource tradeoffs and to determine the most effective plan, contrary to NEPA.	The FEIS contains one additional action alternative that was studied in detail as well as a description of 11 alternatives that were considered but eliminated from detailed study. Therefore, a number of alternatives were considered in the FEIS (Chapter 2).
32-30	NEPA and the CEQ regulations require that the Forest Service "[r]igorously explore and objectively evaluate all reasonable alternatives." 40 C.F.R. § 1502.14(a). The requirement that agencies consider all reasonable alternatives "is at the heart of the environmental impact statement." 40 C.F.R. § 1502.14. The purpose of this requirement is to "sharply defin[e] the issues and provid[e] a clear basis for choice among options by the decisionmaker and the public." Id. The Creeks DEIS fails to comply with this requirement. Other than the "no action" alternative, which is specifically required by law, the DEIS fails to analyze in detail any alternatives, despite the fact that numerous reasonable alternatives were suggested by commenters. Moreover, the reasons offered in the DEIS for eliminating alternatives from detailed review are neither persuasive nor legally sufficient.	The FEIS contains one additional action alternative that was studied in detail as well as a description of 11 alternatives that were considered but eliminated from detailed study. Therefore, a number of alternatives were considered in the FEIS (Chapter 2).
32-31	In our scoping comments dated March 15, 2005, we explained in detail why an alternative based on the 2001 Framework is a reasonable alternative that must be included in the DEIS. In response, the DEIS (p. 49) states that the 2001 ROD has been "superceded" by the 2004 ROD and that an alternative based on the 2001 ROD "would not be consistent with the 1993 Lassen LRMP, as amended by the 2004 SNFPA ROD." The DEIS does not explain how or why an alternative based on the 2001 ROD would be inconsistent with the 2004 ROD, so we cannot respond to this claim in detail. However, with limited exceptions, the QLG pilot project can be implemented consistent with the 2001 ROD. (USDA Forest Service 2001 b, p. 50). Moreover, NEPA requires consideration of all reasonable alternatives, even alternatives that might require a change in law, policy, or regulation.	The inapplicability of the 2001 SNFPA ROD has already been decided (Creeks Project FEIS, Chapter 2). The 2004 SNFPA ROD replaced the 2001 SNFPA ROD in its entirety. Refer to comment 32-30 regarding other alternatives considered in the FEIS.
32-32	The revised DEIS should consider alternatives with lower diameter limits (e.g., 12-20" dbh, depending upon land allocation) and higher canopy cover retention standards (e.g., 50 percent). Forest Service analysis of other QLG logging projects has demonstrated that fuels reduction objectives can be satisfied utilizing a 20" dbh limit, rather than the 30" dbh limit in the proposed action. (Tahoe National Forest 2005, pp. 12-14; Lassen National Forest 2004). Moreover, the best available research indicates that the Forest Service's fuels reduction objectives can be met without logging trees	The alternative being suggested reflects the standards and guidelines of the 2001 SNFPA ROD. The inapplicability of the 2001 SNFPA ROD has already been decided (Creeks Project FEIS, Chapter 2). The 2004 SNFPA ROD replaced the 2001 SNFPA ROD in its entirety.

Comment #	Comment	Response
	greater than 20" dbh or reducing canopy cover below 50 percent. (SNFPC etal. 2004, pp. 62-71).	
32-33	An alternative based on the 2001 ROD is a "reasonable alternative" as that term is used in NEPA, for several reasons. First, there is strong support for the 2001 ROD within the scientific community, federal and state agencies, and the public. As demonstrated in the Campaign's administrative appeal of the 2004 ROD, leading researchers on the California spotted owl, Pacific fisher, and American marten have criticized the 2004 ROD and urged the Forest Service to implement the 2001 ROD instead. See, e.g., Verner 2003; Blakesley and Noon 2004; Noon 2004; Peery 2004; Bond 2003; Franklin et al. 2003; Barrett 2004; Kucera 2004; Lewis 2003a, 2003b; Buskirk 2003). The overwhelming opinion of leading wildlife experts in support of the 2001 ROD demonstrates that an alternative consistent with the 2001 ROD requires consideration in the EA or EIS for this project. Second, the U.S. Environmental Protection Agency, in its scoping comments on similar projects, has specifically requested that the Forest Service evaluate an alternative that would implement the 2001 Framework and "include a description of the various environmental, social and economic issues, and the pros and cons of each management approach." (U.S. EPA 2004). As noted by EPA, "public debate continues regarding the scientific basis for; the fuel management, environmental and social benefits of; and the adverse effect associated with the 2004 SNFPA ROD versus the Sierra Nevada Framework." Therefore, EPA urged the Forest Service to "reconsider whether to evaluate an alternative which would implement the 2001" Framework. Third, there is enormous public support for the 2001 ROD, including over 6,000 administrative appeals of the 2004 ROD. Fourth, a 2001 ROD alternative needs to be considered to "sharply defin[e] the issues and provid[e] a clear basis for choice among options by the decisionmaker and the public." 40 C.F.R. § 1502.14.	The inapplicability of the 2001 SNFPA ROD has already been decided (Creeks Project FEIS, Chapter 2). The 2004 SNFPA ROD replaced the 2001 SNFPA ROD in its entirety.
33-1	Table 1 - GIS layers of "ecologically important land designations" relevant to the Creeks project.	Comment not substantive, "ecologically important land designations" are not a land allocation recognized by the Lassen LRMP.
33-3	Table 2 - Overlap between Creeks treatment units and ecologically important areas.	Refer to comment 33-1.
33-7	Table 3. Summary information for eight timber sale EAs and EISs that individually cover more than 1,000 acres and that have decision documents signed or for which scoping has been initiated since the 2004 Record of Decision of the SNFPA.	Appendix A of the FEIS contains a description of the projects of relevance to the cumulative effects analysis for this project.

Comment letters received from Federal, State and local agencies and elected officials.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

July 11, 2005

Al Vazquez, District
Ranger Almanor Ranger
District P.O. Box 767
Chester, California 96020

Subject: Draft Environmental Impact Statement (DEIS) for the Creeks Forest Health Recovery Project, Plumas County, California (CEQ #20050200)

Dear Mr. Vazquez:

The U.S. Environmental Protection Agency (EPA) has reviewed the above-referenced document pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508) and Section 309 of the Clean Air Act.

The Forest Service proposes to develop a network of defensible fuel profile zones, establish group selection harvest units, and conduct area thinnings within the Creeks analysis area in the Lassen National Forest. These management activities were developed to implement and be consistent with the Lassen National Forest Land and Resource Management Plan, as amended by the Herger-Feinstein Quincy Library Group Forest Recovery Act, and the Sierra Nevada Forest Plan Amendment.

Based on our review, we have rated the DEIS as Environmental Concerns - Insufficient Information (EC-2). We have concerns about impacts to water and air quality, potential environmental justice impacts, and consultation with tribal governments. Please see the enclosed Detailed Comments for a description of these concerns and our recommendations. A Summary of EPA Rating Definitions *is also enclosed.*

We appreciate the opportunity to review this DEIS. When the Final EIS is released for public review, please send two copies to the address above (mail code: CED-2). If you have any questions, please contact me or David P. Schmidt, the lead reviewer for this project. David can be reached at 415-972-3792 or schmidt.davidp@epa.gov.

Sincerely,



Nova Blazej, Acting Manager
Environmental Review Office
Communities and Ecosystems
Division

Primed on Recycled Paper

Enclosures:

EPA's Detailed Comments Summary of EPA Rating Definitions

cc: Gretchen Bennitt, Northern Sierra Air Quality Management District W. James Wagoner, Butte County Air Quality Management District Robert Schneider, Central Valley Regional Water Quality Control Board

EPA DETAILED COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR THE CREEKS FOREST HEALTH RECOVERY PROJECT, JULY 11, 2005

Water Quality Impacts

The DEIS indicates that the overall result of project activities would most likely be a reduction in annual delivery of sediment to stream channels due to treatments of road crossings and surfaces (p. 177, emphasis added). The DEIS also indicates that the removal of channel crossings on several roads that are being decommissioned will result in a short-term increase of sediment in stream reaches below these crossings. The document does not provide a description of monitoring that will be performed to assess the long-term impacts to water quality from the project and the potential need for adaptive management based on monitoring results.

The DEIS states that appropriate Best Management Practices (BMPs) that protect water quality and soils would be implemented for the project. The document indicates that BMPs are described in Water Quality Management for Forest Service System Lands in California, Best Management Practices (USDA FS, 2000), and describes several specific measures that would be implemented to protect soil and water resources.

The referenced Best Management Practices document describes watershed management practices that include water quality monitoring (Practice 7-6, p. 94) and describes a BMP evaluation process (Section 15, p. 123) for evaluating the implementation and effectiveness of BMPs. However, the DEIS does not indicate how these evaluation tools will be applied to this project, and does not provide a description of the specific monitoring that will take place or the adaptive management practices that will be used.

Recommendation:

The FEIS should include a specific strategy for monitoring and adaptive management to assure impacts to water quality and other resources are evaluated and practices are modified as necessary to protect these resources. The FEIS should clarify the specific BMPs in the referenced Best Management Practices document that will be used. Specific information should be provided on the type of evaluation and monitoring planned, the responsible party, and the frequency and duration of monitoring activities. The FEIS should estimate the improvements to water quality that will result through the application of BMPs and adaptive management practices.

Air Quality Impacts

The DEIS indicates that the project area lies within both the Northern Sierra Air Quality Management District (AQMD) and the Butte County AQMD, and that a smoke management plan would be submitted to and approved by the involved agencies prior to any burning in the Creeks Project area. It indicates that several communities are proximate to the areas where pile and prescribed burning is proposed to occur, and that by adhering to an approved smoke management plan, particulate matter emissions from pile or understory burning would not violate California Ambient Air Quality emission standards.

The DEIS does not address existing air quality conditions, anticipated emission levels, locations of the referenced communities, local weather patterns, and additional information to support the assertion of compliance with all applicable air regulations. The document also does not discuss potential health impacts to sensitive populations (i.e., sensitive receptors located at schools, medical centers, retirement complexes, etc.) that may exist in the affected communities.

Recommendation:

The FEIS should provide information on existing air quality conditions in the project area, airshed and prevailing wind directions throughout the year, and a description of modeling results that specify anticipated emission rates under the alternates, including the large wildfire burns anticipated under the no-action alternative. Federal National Ambient Air Quality Standards (NAAQS) should be discussed, and compliance with NAAQS and state standards should be evaluated under both alternatives. Information should be provided on the potentially effected communities, their locations, and sensitive populations that may be impacted. Major components of the smoke management plan should be described, especially the public notice component of the plan, and mitigation measures proposed as necessary. The FEIS should estimate improvements to air quality through the application of mitigation measures.

Environmental Justice

Executive Order 12898, Federal Actions to Address EnvironmentalJustice in Minority Populations and Low-Income Populations (February 11,1994), directs Federal agencies to identify and address disproportionately high and adverse human health or environmental effects on minority and low-income populations, allowing those populations a meaningful opportunity to participate in the decision-making process.

The DEIS does not provide information on minority or low-income populations that may exist in the project area, potential impacts to these populations, and efforts to coordinate with them. The community of Jonesville and the Philbrook Lake home sites are cited as areas with a high threat of wildfire, and that smoke from intense, severe wildfires would create both nuisance and health concerns in these communities for considerable durations (p. 96). No information is provided on the populations living in these communities. Guidance by the Council on Environmental Quality (CEQ) clarifies the terms low-income and minority population, which includes Native American, and describes the factors to consider when evaluating disproportionately high and adverse human health effects (Guidance for Federal Agencies on Key Terms in Executive Order 12898, December 1997).

Recommendation:

The FEIS should describe where low-income and minority populations are located, the ethnic make-up of the minority populations, and the sources from which that information was obtained. An assessment of the project's impact on minority and low-income populations should be described and should reflect coordination with those affected populations. The FEIS should describe additional mitigation measures developed to reduce impacts to minority and low-income communities. The FEIS should also estimate the environmental benefits of those mitigation measures.

Consultation and Coordination with Indian Tribal Governments

Executive Order 13175, Consultation and Coordination with Indian Tribal Governments (November 6, 2000), was issued to establish regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, and to strengthen the United States government-to-government relationships with Indian tribes. The Sierra Nevada Forest Plan Amendment (SNFPA) Final Supplemental Environmental Impact Statement (FSEIS) Record of Decision (ROD) states that the Forest Service will work with tribal governments to develop mutually acceptable protocols for government-to-government consultations, and that tribes will be consulted regarding sacred and ceremonial sites, tribal traditional use areas, and other issues of tribal concern.

The DEIS states that scoping was conducted to determine if interested public or tribal parties had specific knowledge or concerns for heritage resources that could be affected by project activities. Outside of the scoping process for this specific resource, there is no indication of communication or coordination with tribal governments, and no description of the government -to-government process specified in the SNFPA FSEIS ROD.

Recommendation:

The FEIS should describe the process and outcome of government-to-government consultation with the tribes in accordance with Executive Order 13175.

SUMMARY OF EPA RATING DEFINITIONS '

This rating system was developed as a means to summarize EPA's level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the EIS.

ENVIRONMENTAL IMPACTS OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impact that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

ADEQUACY OF THE IMPACT STATEMENT

"Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

' From EPA Manual 1640, Policy and Procedures for the Review of Federal Actions Impacting the Environment.

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
1111 Jackson Street, Suite 520
Oakland, CA 94607



06/24/2005

ER#: 05/459

Laurie Tippin
Forest Supervisor
Lassen National Forest
2550 Riverside Drive
Susanville, CA 96130

Teresa
Ne Cay

Subject: Review of Draft Environmental Impact Statement for the Creeks Forest Health Recovery Project, Lassen National Forest, Plumas County, California

Bernice B.M.

Dear Ms. Tippin,

Please return to Robin.
Thanks
ALV

The U.S. Department of the Interior has received and reviewed the subject document and has the following comment to offer:

Page 197, Vegetation Monitoring and Use, first sentence

The sentence "Available forage species for cattle on the allotments includes herbaceous riparian vegetation in meadow and occasionally near streams and wetlands..." implies that some grazing is allowed within riparian areas along streams and other surface-water bodies. The potential impacts of cattle grazing within riparian areas, including delivery of nitrogen and bacteria from feces, and streambank damage and sediment delivery, commonly is of concern. Therefore, consideration should be given to incorporating appropriate best management practices, including preventing access of cattle to sensitive riparian areas.

If you have any questions concerning our comments, please contact Lloyd Woosley, Chief of the USGS Environmental Affairs Program, at (703) 648-5028 or at lwoosley@usgs.gov.

Thank you for the opportunity to review this project.

Sincerely,

Patricia Sanderson Port
Regional Environmental Officer

cc: OEPC, HQ,
FWS, Portland, OR (Concannon)
USGS (Johnson and Woosley)

Appendix D

Snag Retention Guidelines Creeks Forest Health Recovery Project

Wildlife trees will be retained within DFPZ, Area Thin and Group Selection treatment areas at levels ranging from 2 to 4 per acre within mixed conifer stands and 4 to 6 per acre within true fir stands.
Designate only Stage 1 and Stage 2 as wildlife trees within the DFPZ. Within Area Thinning treatment areas retain trees that meet the criteria for Stages 1, 2 and 3. No wildlife trees will be retained within one tree length of any road including temporary roads or landing locations. **Snag Class Stage 4 – the so called "typical snag" will not be designated and retained as a Wildlife tree.**
As indicated below, a wildlife tree is not necessarily a dead snag but should have some decadent component.

Stage 1 – Hard (live)

Stage 1 includes live trees that have evidence of disease and are likely to die within the expected lifetime of the project. Priority Stage 1 trees will have one or more of the following conditions:

- Sloughing bark greater than ½ the diameter of the bole (generally occurs in the top 1/3 of the tree).
- Obvious fading throughout the tree.
- Bug attacks that indicate imminent mortality (mountain and western pine beetles).
- Obvious (fresh) woodpecker excavations through the cambium (exception – sapsuckers will place holes slightly smaller than a dime in a circular pattern around the bole of the tree).

Stage 2 – Hard (declining)

Stage 2 includes live trees with a spike-top or over mature trees.

- Spike-top or snap off trees (greater than 20" DBH and greater than 20' tall). The spike (no live limbs) must constitute approximately 1/3 to 1/2 the length of the tree. These may also be trees that are dying from the top down (infected by IPS) and the top is recently dead but the remainder is green.
- Over mature trees that have flattened out and are no longer putting on top growth.

Stage 3 – Soft (dead)

Stage 3 includes recently dead trees (including trees where 75% of the needles are dead and the remaining needles show signs of fading).

Stage 4 – Soft (dead with loose bark)

This stage is the "typical" snag. For purposes of wildlife retention, the snag is totally dead with a minimum of 15" DBH and 20' in height. The snag may be in various stages of decay but remains solid (no outward sign of decay or disease such as annosus root rot) and is likely to remain standing for 2 years.

Species Priority

Highest Priority (in order of preference): Douglas fir, Ponderosa pine/Sugar pine, Incense cedar, Jeffrey pine, Red fir, Hardwoods > 12 inches at 1 foot above ground level.

Lowest Priority (in order of preference): White fir, Lodgepole pine, Western white pine.

Characteristics for Priority Wildlife Trees (in order of preference):

1. Existing use by wildlife (>15" DBH and regardless of stage or species), e.g., large stick nests, large cavities (>3" diameter), small cavities (<3" diameter).
2. Stage 1 trees > 24" DBH.
3. Snap-offs (Stage 2) at least 20' tall and greater than 20" DBH.
4. Large (>24" DBH) dead trees (Stages 3 and 4)
5. Spiketops of any size (>15" DBH for High Priority species and >20" DBH for Low Priority species).
6. Any Stage 1 – 4 >15" DBH and 20' in height and is in the Highest Priority Group.

Appendix E – Best Management Practices

Best Management Practices Applied to Creeks Forest Health Recovery Project

Practice No.	Timber
1.1	Timber Sale Planning Process
1.2	Timber Harvest Unit Design
1.3	Surface Erosion Hazard Determination for Timber Harvest Unit Design
1.4	Use of Sale Area Maps and/or Project Maps for Designating Water Quality Protection Needs
1.5	Limiting Operating Periods of Timber Sale Activities
1.6	Protection of Unstable Areas
1.7	Prescribing the Size and Shape of Regeneration Harvest Units
1.8	Streamside Management Zone Designation
1.9	Determining Tractor Loggable Ground
1.10	Tractor Skidding Design
1.11	Suspended Log Yarding in Timber Harvesting
1.12	Log Landing Location
1.13	Erosion Prevention and Control Measures During Timber Sale Operations
1.14	Special Erosion Prevention Measures on Disturbed Land
1.15	Revegetation of Areas Disturbed by Harvest Activities
1.16	Log Landing Erosion
1.17	Erosion Control on Skid Trails
1.18	Meadow Protection During Timber Harvesting
1.19	Streamcourse and Aquatic Protection
1.20	Erosion Control Structure Maintenance
1.21	Acceptance of Timber Sale Erosion Control Measures Before Sale Closure
1.22	Slash Treatment in Sensitive Areas
1.23	Five-Year Reforestation Requirement

Practice No.	Road and Building Site Construction
2.1	General Guidelines for the Location and Design of Roads
2.2	Erosion Control Plan
2.3	Timing of Construction Activities
2.4	Stabilization of Road Slope Surfaces and Spoil Disposal Areas
2.5	Road Slope Stabilization Construction Practices
2.6	Dispersion of Subsurface Drainage from Cut and Fill Slopes
2.7	Control of Road Drainage

Practice No.	Road and Building Site Construction
2.8	Constraints Related to Pioneer Road Construction
2.9	Timely Erosion Control Measures on Incomplete Road and Stream-crossing Projects
2.10	Construction of Stable Embankments
2.11	Control of Sidecast Material During Construction and Maintenance
2.12	Servicing and Refueling Equipment
2.13	Control of Construction and Maintenance Activities Adjacent to SMZs
2.14	Controlling In-Channel Excavation
2.15	Stream-crossings on Temporary Roads
2.15	Bridge and Culvert Installation
2.17	Disposal of Right-of-Way and Roadside Debris
2.19	Water Source Development Consistent with Water Quality Protection
2.20	Maintenance of Roads
2.23	Road Surface Treatment to Prevent Loss of Materials
2.24	Traffic Control During Wet Periods
2.25	Snow Removal Controls to Avoid Resource Damage
2.26	Obliteration or Decommissioning of Roads
2.27	Restoration of Borrow Pits and Quarries
2.28	Surface Erosion Control at Facility Sites
Practice No.	**Vegetative Manipulation**
5.6	Soil Moisture Limitations for Tractor Operations
Practice No.	**Fire Suppression and Fuels Management**
6.1	Fire and Fuel Management Activities
6.2	Consideration of Water Quality in Formulating Fire Prescriptions
6.3	Protection of Water Quality from Prescribed Burning Effects
Practice No.	**Watershed Management**
7.6	Water Quality Monitoring
7.7	Cumulative Off-site Watershed Effects

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